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# THE JOURNAL OF SPEECH AND HEARING DISORDERS

Volume 21 Sept. 1956 Number 3

MANUSCRIPTS and related correspondence should be addressed to: Gordon E. Peterson, Editor, *Journal of Speech and Hearing Disorders*, Department of Speech, 3223 Angell Hall, University of Michigan, Ann Arbor, Michigan.

SUBSCRIPTIONS and orders for back numbers should be addressed to: George A. Kopp, Business Manager, *Journal of Speech and Hearing Disorders*, Speech Clinic, Wayne State University, Detroit, Michigan.

NEWS and announcements should be addressed to: Mary Huber, Department of Speech, Los Angeles State College, Los Angeles, California.

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*The Journal of Speech and Hearing Disorders* is published by the American Speech and Hearing Association in March, June, September, October and December of each year. Volumes 1-12 appeared under the title *The Journal of Speech Disorders*.

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Subscription: $5.00 per year in U.S.A.; $5.50 per year outside U.S.A.; $1.35 per single copy. Entered as second-class matter at the Post Office in Danville, Illinois, under Act of Congress of March 3, 1879. Printed by The Interstate Printers and Publishers, Inc., 19-27 North Jackson Street, Danville, Illinois.

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# Effective Utilization Of Staff Time In Public School Speech Correction

Bernice G. Fein

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Harry J. Kone

Carol Raymond McClintock

Chicago's public school speech correction program, one of the oldest in the country, began in 1910 (2). Since then its staff has increased steadily to the present size of 70, permitting extension of service to increasing numbers of schools. The responsibility of the individual therapist, however, has been reduced from a typical load of ten schools to a typical load of five schools today. Even more importantly, the number of children handled by an individual therapist has been reduced to an average of 25 a day or a total of 125 a week.

It has been the general practice in Chicago for the speech therapist to make one visit a week to each school. It is hoped and planned that eventually staff size can be increased to a point where the desirable minimum of two visits per week will be possible. In the meantime, the problem to be faced is how best to utilize the existing staff of 70 speech therapists.

The 'block system' of concentrated therapy (every day for six to eight weeks) was considered and rejected as being so unwieldy administratively in a large school system as to outweigh any possible advantages. It was also considered inadvisable to decrease the scope of the program by dropping any schools currently receiving service, because of the loss of interest and cooperation of principals and teachers which would ensue. Any experiment in utilization of staff had to take place, therefore, within the framework of the present staff size and the list of schools now receiving service. Various other possible plans were considered and rejected.

The plan finally set up for investigation involved no increase in staff, no elimination of schools, and no reduction in case load, but merely a rearrangement of each therapist's time schedule. The question raised was as follows: Could a therapist achieve more effective results by visiting a school twice a week for one semester and giving no therapy the other semester, than by the present plan of one visit a week for both semesters of the school year? An experiment de-

Bernice G. Fein (M.A., State University of Iowa, 1950), Muriel Green Golman (B.A., University of Michigan, 1948), and Harry J. Kone (M.A., Northwestern University, 1952) are speech therapists on the staff of the Division of Speech Correction, Chicago Public Schools. Carol Raymond McClintock (M.A., State University of Iowa, 1948) was formerly a member of the above staff.

signed to compare these two ways of scheduling therapists was planned and directed by Dr. Margaret Hall Powers, Director of the Division of Speech Correction of the Chicago Public Schools. The four writers were appointed by her as a committee to plan and supervise the details of the experiment and to evaluate its results.

The problem as finally formulated can be stated as follows: Will more speech improvement take place in children receiving therapy on a twice-a-week basis for one semester than in those receiving therapy on a once-a-week basis for two semesters? The study was undertaken to throw light on a practical administrative problem. It had to be limited by the practical necessity of maintaining a program oriented toward service rather than research. The study should be considered with that in mind.

## Subjects and Procedure

Forty speech therapists participated in this collaborative experimental project; all were regular members of the Division of Speech Correction staff. The program extended through the school year 1953-1954 and included 200 elementary schools. More than 800 subjects were selected at the beginning of the school year after a screening of 6,200 children.

*Procedure.* Each speech therapist selected two schools from his regular schedule (usually five schools) to use as 'experimental' schools, using the remaining schools as 'control' schools. Each therapist atttempted to balance his experimental and control schools as much as possible for the type of community in which they were located. The experimental schools were those visited twice a week for one semester, School 'A' being visited the first semester and not the second, School 'B' being visited the second semester and not the first. The control schools were visited once a week for both semesters. Each experimental school was visited once a month for a half day during the semester in which no regular weekly visits were made. This was for the purpose of teacher conferences and maintaining of contacts, rather than for therapy.

Each therapist matched a child from an experimental school with a child from a control school according to the criteria listed below. As many pairs as could be satisfactorily matched within the defined limits were included in the experiment. The 'experimental' child received two speech therapy sessions a week for either the first or the second semester, but not both. The 'control' child received one therapy session a week for both semesters.

*Matching Criteria.* The following criteria were used in matching the experimental and control members of a pair:

1. Age. The maximum difference between members of a pair was twelve months.

2. Intelligence. Three levels of intelligence were recognized: average (IQ=90-109), above average (IQ= 110 or over), and below average IQ=89 or lower). Members of a pair had to be on the same IQ level. Children with IQ's below 75 were not included in the experiment. Test data from the regular school records were used and no special intelligence testing was done.

3. Sex. Boys were matched with boys, girls with girls.

4. Race. Children were matched within the same broad racial group: Caucasian, Oriental, or Negroid.

5. General speech status. Children were matched for type of speech problem. For articulation problems, three general groups were distinguished: (1) children with only one consistent misarticulation, (2) children with two or more sound errors of a specific and consistent nature, and, (3) children with an infantile pattern of numerous, often inconsistent, misarticulations. The specific sound to be attacked in therapy was also to be the same for both members of a pair.

6. History of speech therapy. Length of previous therapy was considered. Children with no previous therapy were not matched with those who had had some training already. Children with more than two years of work were not matched with those who had less than that.

7. Group or individual therapy. Children who were to be handled individually for the year were not matched with those scheduled for group work.

8. Significant related factors. Therapists were to note any particularly unfavorable factors which might have such a marked effect on therapy as to outweigh all other considerations of matching. Such factors as the following might make this kind of difference: (1) physical abnormalities, *i.e.*, severe malocclusion, paralyzed muscles, *etc.*, (2) extremely poor home conditions, *i.e.* lack of understanding, heavy pressure from parents, unhappy sibling relationships, lack of needed physical care, meager language environment, poor language standards in the neighborhood, *etc.*, (3) serious academic problems, *i.e.* apathy toward school, poor adjustment to school, *etc.*, (4) personality problems, *i.e.*, indications of poor adjustment, feelings of inadequacy, inferiority, *etc.*

*Testing and Evaluation Procedures.* In September, at the beginning of the school year, the therapists selected and paired the children for the study and then prepared a speech profile for each child, using the Standard Speech Diagnostic Test by Mendelson and Robinson (*1*). This test involves picture identification designed to give an adequate speech profile for each child. The words illustrated include all consonant, vowel, and diphthong sounds in standard American English. Each sound is tested several times. For example, [s] is represented 16 times, [l] 11 times, [r] 19 times, *etc.* The total number of errors for the specific sound worked on was tabulated. Also computed were all other errors made on the test. A total of 136 errors was possible. The numerical count of errors for a given sound was thus an indication of the consistency of a child's misarticulation. A record of each child's speech progress was kept on this test form, different colors designating original testing and the re-testings. All experimental children were retested in February and June. All control children were retested in June only. To aid in obtaining spontaneous speech during the test situations, each therapist was provided with a copy of a picture illustrating various activities familiar to children. This picture was also used as an aid in the final evaluations of the children's speech.

*Subjective Evaluation.* It was recognized at the outset of the study that the numerical scores of the articulation testing could not be considered an entirely valid description of any child's speech status. Factors such as awareness of the test situation, desire to please the therapist, interest in performing well, and other attitudes of cautiousness, would certainly function

in many cases to distort the accuracy with which the error score represented the seriousness of the speech problem. For this reason, it was considered reasonable to include in the study a subjective evaluation by each therapist regarding the progress of the pupils concerned. A check list entitled 'General Progress Evaluation' was devised and the therapist rated each child's progress according to the following criteria: the child's recognition of his own errors; tendency for self-correction; ability to produce the sound correctly with and without stimulation, in isolation, in syllables, in various word positions, and in spontaneous speech. Each of these factors was to be judged as appearing (1) consistently, (2) inconsistently, or (3) not at all.

Another progress report was also prepared—a rating scale on which judgments were entered as to general behavioral changes related to speech. The following characteristics were to be noted:

1. General intelligibility: increased vocalization, use of greater variety of sounds, greater tendency to articulate complete word, and improvement of general language level.

2. Ease in speaking situations: ease in initiating speech, reduction of general body tensions, and fewer extraneous movements.

3. Ability to verbalize about own speech problem.

4. Improvement in degree of interest in speech. This might have been indicated by the care with which home assignments were completed, the bringing of new material to class, prompt arrival for the speech lessons, or in other ways.

5. Correction of other defective sounds without specific therapy.

Stutterers were compared solely on the basis of this subjective evaluation.

*Subjects.* At the outset, more than 400 pairs of children were included in the study. Transfers of pupils to other schools and outside the city automatically eliminated many pairs. In addition, therapists were free to drop from the study any youngsters who proved later to be so poorly matched that comparisons would have had little meaning.

Complete records for the year were collected for 305 pairs of children. Of these, 299 pairs had articulatory problems and 6 pairs were stuttering cases. It was originally planned to include data on stutterers in the final tabulations. However, when these data were assembled it was found that no generalizations could be made from so few cases. Therefore, all information pertaining to stutterers was omitted. The final results of the study are based on data from 299 pairs of articulation cases.

In Chicago, special schools and classes for the crippled, deaf, and hard of hearing handle many children who ordinarily would be included in the speech therapist's case load. Cerebral palsied and acoustically handicapped youngsters are not usually found in the regular public schools and were, therefore, not included in this study. The incidence of cleft palate cases was too small in the case load of any single therapist to permit satisfactory matching for purposes of this study.

*Therapy.* The children in the experiment, both 'experimental' and 'control' cases, were scheduled for therapy along with other children in their own schools *not* included in the experiment. No attempt was made to separate out for therapy the children involved in the pairings, since this would have introduced variables other

TABLE 1. Error scores on the Standard Speech Diagnostic Test (1).

| | *Experimental (n=299)* | *Control (n=299)* |
|---|---|---|
| September test | | |
| Specific sound receiving therapy | | |
| Total errors | 4006 | 3724 |
| Mean | 13.4 | 12.5 |
| General articulation status (all sounds) | | |
| Total errors | 6710 | 6666 |
| Mean | 22.4 | 22.3 |
| June test | | |
| Specific sound receiving therapy | | |
| Total errors | 821 | 794 |
| Mean | 2.7 | 2.7 |
| General articulation status (all sounds) | | |
| Total errors | 2241 | 2216 |
| Mean | 7.5 | 7.4 |
| September to June difference | | |
| Specific sound receiving therapy | | |
| Total difference score | 3185 | 2930 |
| Mean difference | 10.7 | 9.8 |
| General articulation status (all sounds) | | |
| Total difference score | 4469 | 4450 |
| Mean difference | 14.9 | 14.9 |

than the one under investigation. Each therapist used his own therapeutic frame of reference for handling the cases in the experiments since there were no restrictions nor limitations concerning techniques or methods of therapy. Since each therapist is responsible for enrollment and dismissal of cases in his own schools, the resulting data from the experiment were shaped by 40 participating therapists rather than by any rigid control by an experimenter.

## Results

*Articulation Test Scores.* The results of the testing with the Standard Speech Diagnostic Test (*1*) are shown in Table 1. In the results of the September testing it can be seen that the averages for the two groups were approximately equal. This is evidenced both by the mean number of misarticulations on the sound receiving therapy and on the total error score, indicating general articulation status. The difference between groups was slight for the specific sound receiving therapy—a mean error score of 13.4 for the experimental group and 12.5 for the control group. The difference was also slight for general articulation status as shown in mean total error scores of 22.4 for the experimental group and 22.3 for the control group. The fact that these total error scores at the beginning of the experiment were very close for the two groups indicated that the test scores could be useful in a final comparative evaluation of therapy results.

Mean June test scores for the specific sound worked on during therapy were the same for the two groups. The mean error score per child was 2.7 for the experimental group, and 2.7 for the control group. It would seem valid to conclude that, although both

TABLE 2. Evaluation of progress in therapy based on specific sound correction.

| Group | Level of progress: Excellent Number | Excellent Percent | Fair Number | Fair Percent | Negligible Number | Negligible Percent |
|---|---|---|---|---|---|---|
| Experimental (n=299) | 121 | 40.5 | 165 | 55.2 | 13 | 4.3 |
| Control (n=299) | 132 | 44.1 | 161 | 53.8 | 6 | 2.0 |

groups made progress, the experimental group did not make more progress but that the therapy progress for the two groups was about equal. Considering all sounds, or general articulation status, it should be noted that other defective sounds were corrected as indirect benefits of working with *only one* specific sound, or phoneme, during the course of the experiment. The mean error scores for general articulation status were the same for both groups on the end of the year testing. Thus, there is no evidence of a difference between experimental and control groups in either the progress made on the articulation of a specific sound or in improvement in articulation as a whole.

*Subjective Evaluations.* For purposes of comparison, the several criteria of specific speech progress (recognition of own errors, ability to produce the correct sound in various situations, tendency for self-correction, *etc.*) were considered together for each child to determine his classification within one of three descriptive levels: excellent, fair, or negligible. The classification was made by an evaluating committee, not by the 40 therapists supplying data. The results (Table 2) of this non-quantitative evaluation apparently favor slightly the control children. Excellent progress was designated for 40.5% of the experimentals and 44.1% of the controls; negligible progress for 4.3% of the experimentals and 2.0% of the controls.

The *general* progress evaluations made of each child by his therapist were also classified by the evaluating committee into the same three descriptive levels listed above. These were ratings by the therapists of behavioral changes in pupils, based on related factors in the speech therapy situation (willingness to talk, ease in speaking situations, *etc.*). As indirect benefits of therapy, such factors, it was felt, might be important in evaluating the total therapy procedures of the experiment. These data are presented in

TABLE 3. Evaluation of progress in therapy based on behavioral changes*

| Group | Level of progress: Excellent Number | Excellent Percent | Fair Number | Fair Percent | Negligible Number | Negligible Percent |
|---|---|---|---|---|---|---|
| Experimental (n=292) | 142 | 48.6 | 123 | 42.1 | 27 | 9.2 |
| Control (n=279) | 120 | 43.0 | 137 | 49.1 | 22 | 7.9 |

*Seven of the experimental and 20 of the control children had to be omitted from this evaluation because for them no problem of the type being considered here had existed even at the beginning of the experiment.

Table 3. Of the experimental group, 48.6% showed excellent progress as compared with 43.0% of the controls; fair progress was evidenced by 42.1% of the experimentals and 49.1% of the controls; negligible progress was shown by 9.2% of the experimentals and 7.9% of the controls. These differences are probably not large enough to be important.

In none of the three evaluations did there appear to be important differences in progress between the two groups of children. It would seem that twice-a-week therapy for one semester has no obvious advantages over once-a-week therapy during the entire school year.

It is recognized, however, that this study is a limited one; its one year duration may have obscured results which might prove significant over a longer period of time. The introduction of new, unfamiliar and time-consuming testing and recording techniques may have served to obliterate some fine details.

It would seem that the children who received twice-a-week therapy for one semester and none for the second semester, did not *lose*, from a speech standpoint, during the time no regular correction was offered. They seemed to *gain enough* in that period of speech work to offset any loss that occurred when they were not receiving help. This fact may be important in permitting more flexible planning of a therapist's time. Within its limited scope, this study indicates that the two plans are likely to produce similar results.

*Opinion Poll.* It is recognized that a good speech correctionist can function effectively in a school in several ways in addition to *direct* speech therapy. Within his scope lie many possibilities for increasing his influence, such as parent conferences, group or individual discussion periods with teachers, talks to parent groups, *etc.* Understandably, the conscientious therapist who has assumed a maximum case load may be reluctant to by-pass therapy periods for some of these other functions when a two-week interval is thus created between lessons. Such 'branchng-out', however, may result in improved teacher relationships, and parental understanding; these help materially, of course, to promote the speech program and reduce speech problems. The possibility that twice-a-week therapy would encourage activities of this sort among the therapists was felt to be an important area to investigate in comparing the two programs of therapy.

Thus, as a follow-up procedure, four months after the experiment, the speech therapists were asked to express their opinions of the two programs by answering thirteen specific questions (See Appendix). The questions dealt with areas of pupil interest, and with relationships between the therapist and the pupil, the classroom teacher, the parent, and the school. Thirty-one of the 40 participating therapists filled out the follow-up questionnaire. Difference of opinion was wide on individual items, but it was clear that most considered the twice-a-week plan *more* effective for at least half the items enumerated.

More than two-thirds agreed that under the twice-a-week system pupil response to home assignments was more productive, teachers seemed more 'aware' of the speech program, and more personal classroom teacher-speech therapist relationships were possible. Over half felt that under this arrangement the establishment of rapport was easier, a more personal therapist-pupil relationship was possi-

ble, and that parent contacts were more easily arranged.

On the questionnaire as a whole, over one third of the therapists felt that there was no clear difference between the two systems.

The fact that the several 'advantages' of the twice-a-week plan, as interpreted by the speech therapists, did not reflect any important difference in speech results, does not prove that they are not real. The opinions of the therapists suggest further areas requiring study and point up the complex nature of a project involving personal relationships.

## Summary

During the school year 1953-1954, a study was made in the Chicago Public Schools to examine two ways to utilize the existing speech correction staff. Forty speech correctionists participated in the study, working in some schools twice-a-week for one semester and in the remainder of the schools once-a-week for the entire school year. There were 299 pairs of children involved in the experiment. Children from the twice-a-week schools were designated as 'experimentals'. Each child so designated was carefully matched with a child from a once-a-week school who served as a 'control'. An individual file was kept on each control and experimental child; in this file was a copy of an articulation test with a numerical rating for errors, and a subjective speech evaluation by the therapist. Each therapist proceeded with therapy, using his own methods and materials. All tests were given at the beginning and end of therapy; subjective evaluations were made periodically. Final tabulation of all data indicated a negligible difference in speech progress between the two groups. It would seem from the results obtained from this study that neither plan is more effective than the other, and that the needs, interests, and convenience of the therapists and the schools should be the factors determining which plan to follow.

## Appendix

| I believe that, in general — | *Twice-a-week therapy program* | *Once-a-week therapy program* |
|---|---|---|
| 1. Pupil interest was higher under the: | ___ | ___ |
| 2. Response to home assignments was more productive under the: | ___ | ___ |
| 3. Prompt appearance for therapy lessons was more evident under: | ___ | ___ |
| 4. The establishment of rapport was easier under the: | ___ | ___ |
| 5. A more personal teacher-pupil relationship was possible under: | ___ | ___ |
| 6. Teachers seemed more 'aware' of the speech program under the: | ___ | ___ |
| 7. Teachers cooperated better under: | ___ | ___ |
| 8. Teacher-education (as to aims and methods of the speech program) was easier under the: | ___ | ___ |

| | *Twice-a-week therapy program* | *Once-a-week therapy program* |
|---|---|---|
| 9. Teacher 'appreciation' of the speech program increased under: | ____ | ____ |
| 10. More personal classroom teacher-speech teacher relationships were possible under the: | ____ | ____ |
| 11. The speech program and speech teacher were more accepted as a part of the total school program as a result of the: | ____ | ____ |
| 12. Parent contacts were more easily arranged under the: | ____ | ____ |
| 13. Continuity of program was greater under the: | ____ | ____ |

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1. Mendelson, B. A. and Robinson, E. C. *Standard Speech Diagnostic Test*. New York: Noble and Noble, Publishers, Inc., 1951.

2. Powers, M. H. *Speech Correction*. In *Special Education in the Chicago Public Schools*. rev. ed. Chicago: Chicago Public Schools, 1953.

# Evaluation Of Pure Tone Audiometry With Preschool Age Children

Edgar L. Lowell

Georgina Rushford

Gloria Hoversten

Marguerite Stoner

It is the purpose of this paper to report an attempt to evaluate critically the use of a particular type of play audiometry. Such a method has a legitimate place in the battery of tests available to the diagnostician. Pure tone audiometry alone will not provide an adequate picture, but used in connection with all other indications, it has proved most helpful in work with very young children with a suspected hearing loss.

The John Tracy Clinic has been interested in developing a technique which would be suitable for use with children under five years of age, utilizing the standard measurements available with the audiometer.

Accurate evaluation of hearing impairment in young children has been of major concern to many otologists, audiologists, and educators interested in the well-being of the deaf child. There is a consensus on the importance of early diagnosis as a basis for medical and educational planning. Even a cursory review of the literature brings to light evidence of the concern with this problem.

Many methods have been reported for testing the hearing of young children. The use of sounds from toy noise makers, tuning forks, and whistles to elicit startle responses or other reflex activity have been reported by Aldrich (*1*), Ewing and Ewing (*7*), Froeschels (*9*), Froeschels and Beebe (*10*), Goodhill (*15*), Myklebust (*24*), Richmond and Grossman (*29*) and Utley (*30*).

The use of a conditioned or learned response pairing the manipulation of a toy, pointing to pictures, or pushing a button to illuminate a 'peep show,' with gross sounds, speech, and pure tones, has been reported by the authors mentioned previously and many others.

A conditioned psychogalvanic skin reaction has been used to evaluate hearing impairment by Bordley, *et al.*, (*4, 5*), Goodhill, *et al.*, (*16*), Portmann and Portmann (*28*), Hardy and Bordley (*18*), and Barr (*2*). A critical review by Goldstein (*13*) emphasizes a number of as yet unresolved problems inherent in this method.

Promising work with electroencephalography has also been reported

Edgar L. Lowell (Ph.D., Harvard University, 1952) is Administrator and Director of Research, and Georgina Rushford (M.A., Columbia Teachers' College, 1952), Gloria Hoversten (M.A., University of Iowa, 1952), and Marguerite Stoner (M.A., Columbia Teachers' College, 1946) are staff members of the John Tracy Clinic.

by Marcus, *et al.*, (*21*), Gidoll (*12*), Perl, *et al.*, (*27*), and Michels and Rant (*22*).

## Method

The method in use at the John Tracy Clinic is an extension of some of the techniques mentioned. The particular version of this general procedure (described in detail in Appendix I) involves teaching a child to make a simple motor response with a toy to an audiometric tone. The tester, after establishing rapport, provides an imitative model for the child and reinforces correct responses by showing approval.

The child initially learns to make a response to a drum beat, which he can also see and feel. After this response is learned, the audiometer tone is substituted for the drum. The testing is presented as a game with a series of toys which are changed frequently enough to hold the child's interest. These toy activities include such responses as placing rings on a peg, objects in a form board, cars or airplanes in a box, *etc.* Readers interested in this method of testing will wish to view the motion picture, ***Too Young to Say***, which shows the application of this technique to young children.[1]

One of the major problems in testing young children has been holding the child's attention for a sufficient period of time to make an accurate determination of threshold. While it is known from studies of child development (*6, 11, 14, 19, 23*) that the length of a child's attention span increases with age, it is also known that attention span at any age depends on the child's interest and motivation. In this technique, the child is presented with tasks of short duration involving interesting play responses. The length of each activity is flexible and can be adjusted to the developmental level, interest, and motivation of the individual. By offering a wide variety of toys, it is possible to adapt the response activity to the child's attention span.

The usefulness of this technique has been apparent during some four years of clinical experience. The technique has given information which has proved valuable in planning subsequent educational experiences for children seen at and participating in the Clinic. The use of this method makes a critical evaluation desirable. Determination of the validity and reliability of any measurement procedure is an initial step in any evaluation. In the simplest sense, reliability refers to how consistently a measuring device measures what it is measuring; validity refers to how accurately the test measures what it is supposed to be measuring. Reliability information has been collected in a longitudinal study of a number of deaf children who have been seen at the Clinic over a period of years. The validity of the test has been evaluated against the commonly held standard of *normal hearing*.

*Longitudinal Study*. The first attempt at formal evaluation involves a test-retest study on a group of 21 children who were seen at the Clinic over a period of four year. They had an average age of three years, six months at the first testing and six years, eleven months at the latest testing. These children were all classified educationally in Clinic terminology as profoundly deaf; *i.e.*, average losses greater than 80 db through the speech range. The medical classification was

[1]The film is distributed by the University of Southern California, Los Angeles 7, California.

TABLE 1. Mean test-retest thresholds on profoundly deaf children. Average age earliest test: three years, six months; average age latest test: six years, eleven months. (number = 42 ears)*

| *Frequency in cps* | *Earliest Test Threshold in db* | *Latest Test Threshold in db* | *Difference in db* | *Standard Error in db* |
|---|---|---|---|---|
| 250 | 76.8 | 73.5 | 3.3 | 8.4 |
| 500 | 91.8 | 87.3 | 4.5 | 6.7 |
| 1000 | 101.8 | 99.1 | 2.7 | 5.0 |
| 2000 | 101.1 | 100.7 | −.6 | 7.3 |

*In a statistical sense the 42 ears reported above are not independent. One ear from each subject was randomly assigned to separate groups and the results for the independent sub-samples were so similar to the above that combined figures have been presented for ease of exposition.

perceptive hearing loss of numerous etiologies, with no known central involvements.

With full awareness of the limited meaning of a single intelligence test with very young children, all of this group were given the Ontario School Ability Examination. The test was administered when the children were at an average chronological age of three years, six months. The average I.Q. was 98, with a range from 71 to 127. It is felt that the sample is fairly typical of young deaf children with similar otological and psychological classifications.

Both tests were carried out in a suitably quiet room, using an ADC Model 50É or a Beltone Model 10A audiometer. They were done by a number of different testers, all of whom were thoroughly familiar with the technique. The results presented in Table 1 are a comparison of the earliest and latest audiograms, obtained during the time these children were associated with the Clinic Demonstration School.

It will be seen from Table 1 that the average change was no more than would be reasonable to expect on repeated audiograms (*3*). The relatively low standard errors indicate that the distribution of differences was not widely scattered. Of the 168 pairs of thresholds reported, 66% were within 5 db and 89% were within 10 db of each other.

Table 1 is of particular interest because of the rather commonly held view (*24, 25, 8, 31*) of the questionable validity of tests with children under five years of age. There is, however, rather general agreement on the acceptability of such tests when the children are past this age. Evidence that tests with younger children were unsatisfactory does not necessarily mean that younger children cannot respond. It may only mean that the methods employed were not suitable. The evidence presented in Table 1 indicates that results obtained before the suggested critical age of five were very similar to those obtained considerably after that time. Clinically, the earlier tests were as valuable as those obtained three and a half years later.

In attempting to evaluate the findings in Table 1, several questions were raised. In dealing with a sample of profoundly deaf children, many cases were found where no responses were obtainable at the maximum intensity of the audiometer. In these cases, the convention (*17, 26*) of assigning a value of 5 db in excess of the maxi-

TABLE 2. Mean test-retest thresholds on profoundly deaf children with *No Response* entries eliminated.

| *Frequency in cps* | *Earliest Threshold in db* | *Latest Threshold in db* | *Difference in db* | *Standard Error in db* | *No. of Ears Showing Response to Audiometer on Both Tests* |
|---|---|---|---|---|---|
| 200 | 72.4 | 69.0 | 3.4 | 8.1 | 25 |
| 500 | 88.1 | 83.9 | 4.2 | 7.1 | 33 |
| 1000 | 91.0 | 90.0 | 1.0 | 6.6 | 10 |
| 2000 | 85.0 | 89.4 | −4.4 | 10.9 | 9 |

mum setting of the audiometer was adopted. Although defensible, it is difficult to evaluate the possible influence of this assumption on the results. One way to evaluate this influence is to compare the results presented above with those that would be obtained if all cases of *No Response* were omitted (Table 2). While it would be expected that thresholds would be lowered by omitting the extreme cases, a comparison of the threshold difference columns in Tables 1 and 2 shows considerable similarity between the two analyses, thus suggesting that the treatment of *No Response* cases was justified.

In Table 2 the greater number of *No Responses* obtained in the higher frequencies is in keeping with the relatively greater high frequency loss associated with perceptive hearing loss (*20*). Examination of the tests at 4000, 6000 and 8000 cps revealed a continuation of this same pattern. There were only six cases showing responses on both the earliest and latest tests at 4000 cps, two at 6000 cps and none at 8000 cps.

A further evaluation of the treatment of *No Response* cases on the initial test in Table 1 can be made by examining the thresholds of these subjects three and a half years later. If the treatment is justified, it would be expected that if there are any responses on the final test, the response would not be grossly different from the maximum setting of the audiometer.

It is apparent from Table 3 that the majority of the changes were of the

TABLE 3. Distribution of re-test thresholds after 3.5 years for *No Response* entries on initial test.

| | *Frequency in cps* | | | |
|---|---|---|---|---|
| | *250* | *500* | *1000* | *2000* |
| *Initial Test*: Number of *No Responses* | 14 | 9 | 31 | 31 |
| *Final Test*: Number of *No Responses* | 7 | 3 | 17 | 27 |
| TOTAL Number of Changes from *No Response* after 3.5 years. | 7 | 6 | 14 | 4 |
| *Distribution of above changes from No Response in final test*: | | | | |
| Response at max. | 1 | 3 | 8 | 1 |
| Response at 5 db less than max. | 3 | 2 | 6 | 2 |
| Response at 10 db less than max. | 2 | 1 | 0 | 1 |
| Response at 15 db less than max. | 1 | 0 | 0 | 0 |

magnitude to be expected in test-retest evaluations of this sort (*3*). It is felt that this information may also be interpreted as evidence for the justifiability of the treatment of the *No Response* entries in Table 1.

*Study of Children with Normal Hearing.* To evaluate the validity of the technique, a comparison was made with some predicted standard. In this case, the most obvious standard was that of zero threshold, assumed for normally hearing individuals (American Standards Association). Accordingly, tests were conducted on a group of 22 children between the ages of two years, six months and three years, four months, who were presumed to have normal hearing. These measurements were carried on with the same audiometric equipment used in the longitudinal study in the sound-proof test rooms of the University of Southern California. Thresholds in this study were obtained by the standard psycho-physical method of serial exploration explained in Appendix II.

The results of these tests are presented in Table 4. Note that the average thresholds are slightly less than the arbitrary zero point adopted by American Standards Association.

*Comparison of Testing by Independent Teams.* Another way of evaluating the reliability of this testing procedure is to compare the results of two independent teams working with the same subjects. Nine children were tested by two independent teams, using the method of serial exploration described in Appendix II to determine threshold. The audiometers used were calibrated immediately prior to testing and used interchangeably between the two teams to control that possible source of error. The calibrations were carried out with an artificial ear, using a 9A coupler, to ASA standards for output at each frequency.

The mean difference between these two independent teams was 3.9 db with a standard error of 4.2 at 500 cps; 2.5 db with a standard error of 5.3 at 1000 cps; and 3.9 db with a standard error of 6.3 db at 2000 cps. Although the differences between the teams were small, they were consistent, in that one team obtained lower mean thresholds than the other. This was attributed to a difference in the amount of experience of the individual in each team who worked directly with the child. On one team this was done by a regular staff member with considerable experience with the procedure, while on the other a student-in-training worked with the child.

TABLE 4. Average thresholds for normally hearing children between 2 years, 6 months of age and 3 years, 4 months of age. (N – 42 ears)*

| | *Frequency in cps* | | |
|---|---|---|---|
| | 500 | 1000 | 2000 |
| Average threshold in db | –1.4 | –3.9 | –3.0 |
| Standard error in db | 4.9 | 6.4 | 6.9 |

*The results for one child are not included with the group. This subject, age 2 years 7 months, gave below threshold readings in the left ear, while the right ear showed a loss of 20 db at 500 cps, and 25 db at 1000 cps. Although the parents were not aware of this condition, an independent check by an otological consultant revealed evidence of bilateral catarrhal otitis media, with tympanic fluid bilaterally, chronic tonsillitis and chronic adenoiditis.

## Discussion

The results of the testing by independent teams pointed up quite clearly that the technique requires skill and experience, with both the methods of audiometry and the understanding of children. While it is believed that this method is possible, and, in fact, easier than one would have been led to believe by past literature, it is not presented as an easy task or one to be undertaken without a thorough grounding in the fundamentals of audiometry.

It is further not suggested that this method is applicable to all children of any given age. Some children, older than those cited in this study, are difficult, if not impossible, to test. However, there are even younger children who yielded extremely satisfactory results with a minimum of effort. The point to be emphasized is that this technique succeeds in a large majority of the cases over two and a half years of age.

A possible objection to the technique is that it is too time-consuming. Records have been kept on the actual working time for testing 21 children with normal hearing. Excluding the time taken to become acquainted with the child and breaks in the activity when the child appeared to be tiring, it was found that the drum conditioning averaged 3.8 minutes, the transfer to the audiometer 5.4 minutes and the determination of six thresholds (three frequencies in each ear) took 23 minutes, or a total of slightly over a half-hour working time.

Generally, more time was required to complete the test with profoundly deaf children, where the initial conditioning was a more difficult process. After the initial conditioning, however, determination of threshold does not appear to be more time consuming with the deaf than with the normally hearing group.

Another question that has been raised about testing is the number of technicians required. In most cases, the tests can be conducted by one person. In the research studies with children with normal hearing, three people were used—one operating the audiometer, one interacting with the child, and one recording. The film, *Too Young to Say*, illustrates the procedure with two testers. In clinical practice, one person is generally able to conduct the tests without difficulty.

## Summary

It has been the purpose of this paper to present evaluation of a particular technique of play audiometry in use at the John Tracy Clinic. First, the usefulness of this technique has been demonstrated during some four years of clinical experience. The technique has given information which has proved valuable in planning subsequent educational experiences for the children participating in the Clinic Demonstration School. Second, reliability information has been collected in a longitudinal study of a number of deaf children who have been seen at the Clinic over a period of years. Third, the validity of the test has been evaluated against the commonly held standard of *normal hearing*.

The importance of early diagnosis of hearing loss justifies the effort to evaluate critically any audiometric methods suitable for pre-school children. Much of the past literature has suggested that testing such young children is neither practical nor accurate. Clinical experience at the John Tracy Clinic has suggested that

this is not the case, and that a description of this technique may be of interest to other workers confronted with similar problems.

## Acknowledgments

The research on which this article is based was made possible by a grant from the Research Study Club of Los Angeles. The authors are indebted to Dr. Victor Goodhill, Otological Consultant, who gave freely of his time in connection with this project, and to Dr. Victor Garwood and Dr. William Michaels of the University of Southern California for invaluable help in the planning of the evaluation. They also express gratitude to Jean Lynthecum, Marilyn Rudzic, Beverly O'Connor, and George Cox for assistance in the execution of the research; and to Althena Smith for psychological testing.

## Appendix I

The play audiometry in use at the John Tracy Clinic combines features of a number of previously reported methods. It may be described in terms of three interdependent stages: (1) establishing conditioned response to drum beat, (2) transfer to audiometer, and (3) determination of hearing thresholds.

1. *Establishing Conditioned Response to Drum Beat.* The initial stage is demonstration. The first toy used should be one that the tester feels will interest the child, and is within his level of motor ability. The tester holds the toy close to the top of the drum. He then strikes the drum and makes a response with the toy. The response may be putting an airplane in a box or replacing a piece of a peg toy. This is repeated several times, with the tester pretending to listen for the drum beat, and making the response with a visible show of enjoyment. An important part of the demonstration is the apparent pleasure received by the tester from listening and making a response to the drum beat. (The drum is used as the conditioning sound because its vibrations can be felt, even when not heard, by the child with little residual hearing.)

The demonstration continues until the child has enough experience with both sight and hearing to become aware of the relation of the drum beat to the response with the toy. A child will often indicate this awareness, or at least his eagerness to participate in the game, by reaching for the next toy. The tester then gives the toy to the child and at the same time guides his hand to the drum to wait until it is hit. When the drum is sounded, the tester guides the child's hand through the proper response with the toy. This guidance reinforces the child's awarness of the relation between the sound of the drum and response with a toy. As soon as possible, the child is given an opportunity to start making his own responses. By hesitating when guiding the child's hand, the tester can convey to the child that an independent response is expected.

Through repeated encouragement and approval, the tester gradually works toward inducing the child to make an independent response. If, after being guided, the child is not ready to respond, the tester may take a duplicate toy and perform the actions with the child. When both the tester and child are playing the game, the tester gradually drops out.

After the child is responding with certainty to both sight and sound, the sight of the drum is eliminated. An easy way to accomplish this is to move behind the child's chair. The tester encourages the child to put the toy near his ear and listen for the drum. Holding the toy near the ear serves to focus the child's attention on listening for the tone. Most children will want to turn and watch the drum being hit. This turning gives the child confidence in his response. Through being encouraged to listen without looking, he is soon able to respond to the unseen beat of the drum.

Once response to the drum is established through hearing alone, the tester begins to vary not only the time intervals between beats, but also the degree of loudness. This variation is important to prevent the child from getting accustomed to any pattern of response or loudness.

The drum conditioning stage of this procedure is the foundation on which the actual testing depends. Until it has been well established and the child is responding independently and accurately to the drum,

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no attempt should be made to transfer to the audiometer. Conditioning time may vary from a few minutes to several separate work periods, depending on the child. For deaf children who have not had experience listening to sounds, conditioning takes a longer time than for children with considerable residual hearing.

2. *Transfer to the Audiometer.* Once drum conditioning is established, substitution of an audiometric tone for the drum beat is begun. Again, demonstration precedes the child's participation. The tester puts on the earphones, holds a toy close to one ear, and listens for the tone. One way of indicating that there is a tone is by drawing the child's attention to the audiometer button being depressed. To make this obvious, the audiometer can be turned toward the child and the motion of pushing the button greatly over-exaggerated. When the interrupter button is visibly pressed, an immediate response is made with the toy. The tester indicates with pleasure that the tone came through the earphones. He demonstrates his eargerness to listen again by taking another toy and holding it near the earphones.

The demonstration is repeated until the child becomes aware that a response is made to the tone heard through the earphones. If the child's parents are present, the demonstration may be repeated with the parents wearing the earphones and making responses to the audiometer.

In presenting the earphones, no attempt should be made to sneak them on the child. The toy for the child's next response should be given to him, and the earphones placed on without any question on the tester's part as to whether they will be accepted. When the earphones are first placed on, the tone should be given immediately and the child's hand guided in making the response. If the child, at this time or after a few guided responses, wants to remove the earphones, the tester rather than the child should remove them. After a short pause, during which the child may have the opportunity of examining the earphones or choosing his next activity, the tester indicates that it is time to listen again by presenting the next toy and replacing the earphones. The child's responses are guided and his attention is called to the manipulation of the tone lever. Here again, as in drum conditioning, the child should be encouraged to make independent responses to the audiometric tone as soon as possible. The tester gradually reduces his guidance and encourages the child to take the initiative in responding.

If the child refuses the earphones after demonstration on the part of the tester and parent, the phones may be removed from the connecting headband and one held between the tester and child. The tone is then given at maximum loudness and a response is made by the tester. Gradually the earphone is brought closer to the child's ear. He is given a duplicate of the tester's activity and is encouraged to respond with the tester. The headband should be replaced as soon as possible.

When a child persists in objecting to the use of a headband, the parent may hold an earphone to one ear and, through slight pressure with his hand on the opposite side of the child's head, obtain a fairly satisfactory acoustic seal.

The amount of residual hearing revealed by use of gross sounds, response to voice, or the child's own use of voice will determine the intensity of the tone to be presented first. It must be one which the child hears with ease. At this stage of transfer, the child may not be certain what is expected and the use of a tone which he does not hear easily will confuse him.

Response to feeling the tone through the earphones is introduced if the child is unable to make an independent response to audiometric tone. This is done by placing the finger on the earphone. The use of sight and touch provides an opportunity for the child to be given encouragement after successful responses while he is learning to listen to near-threshold tones. The child should be allowed to revert to tactile cues whenever he needs confidence in order to determine tone presence.

Each child has his own response rate. Awareness of a child's particular rate enables the tester to work toward the child's optimum response time. It is important to avoid any tendency toward a slow response pattern. Rapid handling of materials helps the child get ready for a response and sets a pattern for quick action, whereas, too much time spent in getting ready for the next tone may lead to playing, distraction, and slower responses.

Once the child is working independently, it is crucial that the tone be presented only when the child is listening and ready to respond. To present the tone before the child has the toy ready or when he is obviously distracted will confuse him. It is also important that the tester avoid any

rhythm or pattern of tone presentation because children will rapidly pick up the pattern and rely on it as a cue to respond.

Throughout the test a continual change of activities is used as a means of sustaining the child's interest. The length of any one activity depends upon the number of parts it contains. Many activities may be lengthened, if they are of particular interest to the child, or shortened in the event of his tiring or losing interest. Color cones and many peg toys have a definite number of possible responses, whereas throwing balls or flying air planes into a box are activities in which the number of responses can be regulated. Tests that involve a great many responses, while easier for the tester, may make the test situation dull for the child.

With a variety of toys in sight, the child may want to move from toy to toy without completing any one activity. The tester must avoid this by controlling the use of toys and insisting that each activity be completed, if even in a shortened form, before moving on to the next.

When the activity is changed, it is important that the child understand what he is to do. If the activity is very different from previous ones, it may be necessary to guide his response for the first few times. The tester should always have the next activity ready so that changes can be made with as little delay as possible.

The required play response should be as simplified as possible for the child. Some games involve complex responses, such as matching color and form. These are simplified by handing the child the correct color and indicating how the response is to be made.

The length of any test session depends upon the child. The session should be terminated before he tires. This must be anticipated by the tester so that the child leaves with a feeling that the testing was fun. The number of work periods required for the completion of a test depends upon the individual child. Most four year olds complete a test in one session interspersed with a few short rest periods. Children between the ages of two and a half and three often tire more quickly and may require a number of work periods.

*3. Determination of Hearing Thresholds.* When the child is able to give accurate independent response to variations in tone loudness presented at irregular time intervals, the audiometrist proceeds to the third and final stage. He begins with an easily heard tone and works slowly down in five or ten db steps. At the point of no response, a return is made to a louder tone. Several louder tones should then be given to avoid any fatigue from listening to those near threshold.

With children, as with adults, the audiometrist must avoid falling into a rhythm of tone presentation. Facial cues and arm movements should also be avoided. Young deaf children who depend so much on vision are extremely perceptive and may pick up the slightest indication of the audiometrist's movement.

When two testers are used, the person with the child must know at all times when the tone has been presented. Any sort of voiced indication of the tone may become apparent to the child and may be used as a response cue. To avoid this, the audiometrist puts his foot against that of the tester with the child and tone presence is indicated by foot pressure.

After working down to a point of no response several times, an ascending sweep may be started fifteen to twenty db below this point. Ascending sweeps involve a longer waiting period on the child's part and should be interspersed occasionally with louder tones to lessen fatigue. The louder tones also serve to reinforce an awareness of the sound for which the child is listening.

Caution is necessary in the final determination of a threshold. While this involves a judgement by the audiometrist, no threshold determination should be made until a clearly definable point of no response becomes evident. The child's consistency in responding and concentrating determine how many re-crossings of the threshold area are required. Usually less than ten are sufficient.

## Appendix II

In an attempt to standardize the determination of threshold in the tests of children with normal hearing, the standard psycho-physical method of serial exploration was adopted. Ten series of alternate descending and ascending sweeps in five db steps were used. Threshold was determined by the point at which the tone was heard on at least half of the series.

The instructions given the testers were as follows:

1. Recording is to be started immediately after the two testers agree that the child is responding accurately and independently to audiometric tone.

2. Secure five independent consecutive responses to tones around an estimated 40 db above threshold. (On succeeding frequencies, secure three independent, consecutive responses.)

3. Begin recording at estimated 40 db above threshold:

a. Descend in 10 db steps to the 20 db level; then descend in 5 db steps until child makes no response—*end of first descending series.*

b. Begin *first ascending series* at minimum of 5 db lower than the level of no response on first descending series. Ascend in 5 db steps until child makes first response—*end of first ascending series.*

c. Begin *second descending series* at a level to be determined by audiometrist with stipulation that it must begin at a minimum of 15 db above the point of no response on first descending series. The level at which all succeeding descending and ascending series begin should be varied so that the child does not learn to expect a certain number of tones or a constant return to a certain level of loudness. Descend in 5 db steps until child makes no response.

d. At the level at which the child makes no response, turn audiometer toward child and secure three responses using sight of audiometer button being depressed in addition to sound. Then begin *second ascending series* at 5 db below the conditioning tone. Ascend in 5 db steps to level at which child responds. To prevent the child tiring, the audiometrist must be ready immediately to start the next descending series. Because of the return made to louder tones, this descending series provides a rest for the child from the work of listening to the near threshold tones.

e. Begin *third descending series* at level to be determined as described in (c).

f. Begin *third ascending series.*

g. Begin *fourth descending series* at level at which child makes no response. At no response point of this series, repeat *conditioning to sight* as defined in (d).

h. After conditioning procedure, start *fourth ascending series.* (At a minimum of 5 db below no response point as described in (c).

i. Begin *fifth descending series.*

j. At point of no response, go a minimum of 5 db lower to begin the *fifth ascending series.* (The end of the *fifth ascending series* marks the completion of work on any one frequency.)

Try to avoid changing toys near threshold. If toy change is necessary, the audiometrist must repeat tone of same level during which toy change occurred. Suggested places for toy change are at point of conditioning with sight or at beginning of descending series.

If the child makes an error or an anticipatory response, the recorder should mark 'E' for error and 'A' for anticipation, and give the same tone again (at the db level where the child anticipated or made the error). If the child responds to this tone, continue the series; if he does not, count this as a *No Response* and proceed with the next series.

If the child is tiring, stop testing,—try a break. Return to the same frequency, repeating the entire series at which you took a break.

The audiometrist decides whether to repeat a tone if it has been given when the child was not ready. If a tone is repeated, circle the one given when the child was not ready.

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# Audiologic Examination Of The Inner Ear: The Aural-Overload Test

Phillip A. Yantis

Although the audiologist of today has at his disposal a large and varied number of techniques to employ in the examination of normal and abnormal hearing, there has been a comparative lack of procedures with which an accurate examination of the function of the inner ear alone can be undertaken.[1] There are many reasons why such audiologic tests are of importance in the ultimate rehabilitation of the hearing handicapped, as well as in acoustic research.

A test of pure cochlear function is of obvious value in assisting the otologist in the diagnosis of the anatomical locus of the lesion in perceptive-type hearing losses. Even though conventional air and bone conduction thresholds can effectively differentiate conductive from perceptive losses in most instances, the question quite often arises as to whether the lesion causing the loss in perceptive-type cases is confined solely to the end-organ, or whether it is situated at some point along the auditory nerve pathways. The ability to rule out either a cochlear or non-cochlear lesion in perceptive-type losses is of singular importance in cases which lack significant medical history and objective symptoms; such losses could, for instance, be caused by an acoustic tumor. The immediate ability to rule out cochlear involvement would, in this case, provide a much speedier diagnosis. From this standpoint, an audiometric procedure which examines only the function of the inner ear would be of certain clinical value.

The measurement of cochlear reserve in cases of otosclerosis is of utmost significance in the prognosis of fenestration surgery. In this disease, bone-conduction thresholds have not been found always to be an accurate measure of cochlear function; the presence of stapes fixation itself may cause an abnormally decreased bone conduction curve, especially in the middle frequencies (*11*). Other procedures, such as speech discrimination tests, have been applied with some success. However, none of these techniques are as definitive as an objective test of the actual functioning of the inner-ear structures themselves.

Many important applications to research in hearing can be outlined for such a test. For instance, the effects of certain drugs and diseases which have been suspected of adversely in-

[1]In order to avoid any possible confusion, the term 'inner ear' as employed in this paper refers only to the anatomical structures of the cochlea, excluding all structures of the auditory system central to the sensory cells.

Phillip A. Yantis (Ph.D., University of Michigan, 1955) is Research Associate in the Physiological Acoustics Laboratory, Institute of Industrial Health, University of Michigan. This report was supported in part by the Research and Development Division, Office of the Surgeon General, Department of the Army, under Contract DA-49-007-MD-634.

fluencing normal inner-ear functioning could be accurately studied in human ears. Although a great deal of research has been conducted on the auditory effects of anti-biotic drugs, such as streptomycin, no unanimity of opinion concerning the locus or extent of damage involved has been formulated (*20*). The same situation remains to some extent in hearing losses resulting from such conditions as lues, rubella, high fever diseases in general, congenital deafness, senility, *etc.* Hearing losses caused by these conditions are known to be perceptive, but it has not been consistently possible to determine differentially where the primary lesions in these disorders are located.

Tests for the detection of loudness recruitment may be readily applied, at first, to the problems enumerated above; there is no question that the presence of this phenomenon indicates an end-organ involvement (*22*). Hedgecock (*2*) recently described quite fully various examining techniques which have been proposed as tests for recruitment, and there is little need to pursue further their description here.

However, traditional recruitment tests are not always satisfactory in testing all patients and in indicating the anatomical region of morbidity. Either singly or in combination, the alternate monaural and binaural loudness-balance tests cannot always be employed with many patients because of the extent of the hearing losses in individual cases. In order to administer these tests effectively, there must be a difference of at least 25 decibels in the threshold values of either the two ears at the frequency tested, or of the two frequencies tested in the same ear, depending on the technique employed (*4, 9*). It can be seen that there might be instances where certain patients could not be tested using these procedures.

With respect to other techniques which have been advanced in the literature as measures of recruitment, probably the most discussed are the various methods proposed for ascertaining the difference limen for loudness. However, serious questions have recently been raised as to the actual validity of these tests in discriminating the recruitment phenomenon (*4*). Other procedures (*22*) have not been sufficiently explored as yet to make them readily acceptable for clinical testing.

From another viewpoint, however, there is even a greater reason for the inadequacy of these tests for recruitment. Although the causative factors producing the phenomenon are localized in the cochlea, little information is available concerning the anatomical or physiological processes involved which account for the phenomenon. A clinical technique known to test the function of a particular part of the end-organ would seem to be of greater practical, as well as theoretical, significance.

The purpose of this paper is to discuss the applications to clinical audiology of a comparatively new clinical procedure which seems to meet many of the problems stated above: the threshold of aural-overload test. The primary value of this test is that it is known to be a measure of sensory cell function. The evidence for this has come from animal experimentation employing the electrical potentials recorded from the region of the cochlea, and which are directly related to the activity of the sensory cells of the organ of Corti (*15*).

## The Aural-Overload Test

*Animal Experimentation.* The use of electrical potentials as a measure of inner-ear function has been based on the fact that stimulation of the sensory cells of the organ of Corti by sound is intimately related to the production of a.c. potentials which may be detected and amplified by sensitive electronic equipment. This is a well known phenomenon variously called the cochlear a.c. potential, the cochlear microphonic, or the Wever-Bray effect. There are several ways of recording it and there are several explanations of the manner in which it is produced but it is a proven fact that without the sensory cells there are no a.c. potentials, nor is there any hearing (*5*). Any acoustic wave shape or any form of modulation when introduced into the animal's ear is faithfully reproduced in these potentials providing the intensity of the stimulating sound does not become too great.

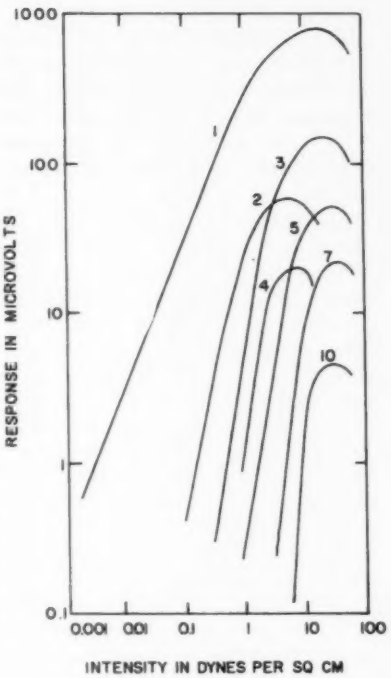



FIGURE 1. The harmonic pattern represented in the cochlear microphonics from a cat's ear being stimulated with a pure tone of 1000 cps. Each curve is numbered according to its place in the harmonic series. The curve marked '7' is thus the component of 7000 cps. Adapted from Wever and Lawrence (*18*).

These electrical responses from the cochlea have been recorded in many different species of animals, including man, and provide an excellent technique for the study of the process of hearing up to and including the structures from which they arise. At low levels of sound there is a linear relationship between the size of these potentials and the magnitude of the stimulating sound: if the amplitude of vibration of the air particles is doubled, the voltage out is doubled. As this amplitude is increased, a point is reached where the electrical response departs from its linear relation: doubling the acoustic amplitude now does not produce a doubling of the electrical response. Finally, the electrical output from the sensory cells reaches a maximum and then decreases with further increase in the driving amplitude. The characteristics of this function were studied and described by Wever and Bray 20 years ago (*16*).

This type of non-linearity is also called harmonic distortion because of the well known characteristic of an overloaded vibrating system: that of generating an increasing percentage of harmonics as the system is driven

further into non-linearity. If a wave analyzer is used to read the cochlear voltage output only at the frequency of interest, it is possible to plot the overtones separately and carry out a harmonic analysis as on any piece of electronic equipment (see Figure 1).

There is no threshold to this a.c. potential; that is, there is no level of stimulus amplitude at which it suddenly appears. It is present at as low a level as one can record and emerges from the noise of the recording amplifiers or from the general physiological noise of the animal. It is possible to establish a sensitivity curve by finding the amount of sound necessary to produce some standard response, say, a microvolt, at various frequencies. This then serves as a baseline and any changes in sensitivity due to altered factors in the ear can be observed by again finding the level of sound necessary to produce the same response.

There is not space here to present all of the evidence regarding the locus of this distortion process. The reader is referred to the series of experiments reported by Wever and Lawrence (*18*) from which it is decisively concluded that this overloading occurs in the sensory cells of the organ of Corti. The rest of the structures up to this region respond with great fidelity to a level of sound that would have already destroyed the inner ear structures. This leaves little doubt that studies of the cochlear potentials reveal the behavior of the organ of Corti as the amplitude of sound is raised to the damaging level.

It is interesting to note that levels of sound in the linear region can be fed into the ear indefinitely, and as long as the animal is maintained in good condition there is no loss in sensitivity. However, after a certain sound level is reached there appears a sensitivity shift which increases gradually with time as the stimulus is maintained. If the sound is kept on long enough at these levels or for shorter periods at higher levels, the loss in sensitivity may become permanent and histological examination will reveal some degree of injury to the organ of Corti (*12*). In this connection, however, there is considerable individual difference. Some ears recover completely from a temporary loss while others may never recover. From what is now known about the action of these cochlear potentials there is no intimation in the amount of sensitivity shift as to the permanency of the loss.

However, one thing appears certain: The condition of the organ of Corti at the moment of insult determines to a large extent its permanent reaction. Evidence for this is reported by Alexander and Githler (*1*) who early in the course of their study observed that after overstimulation, levels of sound to which the guinea pig normally would respond for hours with no loss in sensitivity produce a rapid additional deterioration in the response.

Other experiments (*17*) which have produced a deterioration of the inner ear have also revealed contraction of the dynamic range[2] over which the sensory cells operate as revealed by the electrical potentials. The first indication of this shortened dynamic range is the lowering of the point of departure from linearity with respect

[2]By the term 'dynamic range' is meant the range of response to sound from threshold of audibility to a level which may be injurious.

to some pre-established sensitivity level. Determination of this decreased range by measuring the point at which overloading begins above the pre-established sensitivity level seems to be indicative of an unhealthy condition in the sensory structures of the ear (*6*). The detection of the overtones arising in an overloaded ear thus indicates non-linearity. In the animal, this measure has been possible by the use of a wave analyzer to study cochlear potentials. In human ears, overtones may be detected by the use of the exploring-tone method. This method was proposed originally by Wegel and Lane (*14*) and forms the basis for the technique to be discussed here.

*Human Testing.* The generation of harmonics by the human ear as the level of sound stimulation is increased has been a laboratory observation for some time (*3*). In the untrained ear, these overtones can best be detected by the use of an exploring tone which beats with the harmonic of the fundamental when the frequencies and intensities of the two are close together. The determination of the level of a tone above an individual's threshold at which the second harmonic of this tone can first be detected indicates the beginning of non-linear distortion and is indicative of the shortened dynamic range typical of an unhealthy condition in the inner ear. It is, of course, true that individuals vary considerably in their sensitivity to various tones and this can be caused by many factors, but the only established source of influence for a shortened dynamic range is the inner ear. Clinical experiments carried out in this laboratory show that this is the case. A middle-ear lesion, for example, alters the sensitivity but does not change the level above threshold at which inner-ear overloading occurs. The ear, of course, will in this case be able to withstand a much higher level of sound than before.

The original laboratory equipment used to gather data on human ears has been described in full elsewhere (*6,7*). Very briefly, the recommended technique for determining the overload threshold in human ears is the following:

1. Audibility thresholds are obtained for the fundamental tone to be used (either 1000 or 2000 cps) and for the second harmonic of the fundamental tone selected (either 2000 or 4000 cps).

2. The fundamental frequency is then set on one pure-tone oscillator so that when presented to the ear under test it will be 70 db above audibility threshold for that tone.

3. On a second oscillator, the exploring-tone frequency is made to differ from the frequency of the second harmonic of the fundamental by four cps and then adjusted to be 60 db above the subject's threshold for the second harmonic.

4. The tones are then mixed and switched to the subject's ear under test. In most cases he will hear beats with only a slight adjustment of the exploring-tone intensity. If beats are not heard, the level of both tones is raised equally until beats are readily perceptible.

5. Upon hearing beats (thus establishing aural overload), the levels of both tones are commonly attenuated until the subject says the beats are no longer heard. This level of the fundamental is recorded and considered to be the threshold of aural overload which may be ex-

pressed in terms of any pre-determined level: above .0002 dynes/cm², above audiometric zero, or above threshold of audibility for individual subjects. In the latter case, the number of decibels from threshold of audibility to threshold of aural overload is the range of linear response.

## Clinical Applications

*Diagnosis of Inner-Ear Pathology.* Lawrence and Yantis (7) have presented evidence to show that an abnormally restricted range of linear response, as measured by the exploring-tone technique described above, is intimately related to inner-ear pathology in abnormal ears. Mean overload thresholds in a group of 77 normal-hearing subjects were obtained. The mean level above each individual's threshold at which a tone begins to show non-linearity was 52 db in 145 ears tested at 1000 cps, and 57 db in 133 ears examined at 2000 cps. There was no significant difference between these means and those of a group of conductive-loss cases: the means were 51 and 55 db at 1000 cps and 2000 cps respectively for this latter group.

The means of the ranges from audibility threshold to overload for a group of 20 subjects having inner-ear pathology were very significantly lowered with respect to the means of the normal-hearing group and the conductive-loss group. For 1000 cps the mean was 24 db which is 28 db, or more than two standard deviations, below the mean of the normal group. For 2000 cps the mean was 18 db, which is 39 db lower than the normal group mean. This is five db more than two standard deviations from the normal. Most of the ears tested in the inner-ear pathology category had losses due to either Ménière's disease or acoustic trauma. The locus of the pathology was confirmed by otological diagnosis and the presence of loudness recruitment, when the latter test could be administered.

Little significant data has been presented yet to show definitely the presence of normal ranges of response in those ears having a loss due to pathology of the eighth nerve or higher acoustic pathways. On the basis of evidence presented so far, however, no abnormal restriction would be expected if the cochlear structures are normal. If this supposition is supported by further research, normal ranges of linearity in patients having a perceptive-type loss should point to retrocochlear pathology.

As mentioned previously, another indication of inner-ear involvement is the presence of loudness recruitment. The overwhelming evidence in the literature supports the conclusion that loudness recruitment occurs only in lesions involving the sensory end-organ, and is not expected to be present in lesions involving only the eighth cranial nerve and the higher pathways. In a recent review of the literature by the author (22), the results of recruitment testing in 592 cases with abnormal hearing was classified according to the locus of the lesion causing the loss. For instance, none of the 78 cases reported with known conductive involvement exhibited recruitment, nor did 80 out of 96 cases reported with known auditory-nerve involvement. However, 317 out of 333 cases showed definite recruitment with a loss due to a cochlear lesion.

Although many audiometric procedures have been proposed for detecting the recruitment phenomenon, it is sometimes difficult to apply any one procedure to all types of hearing losses of a perceptive type, as discussed earlier. This particular problem is greatly lessened in the application of the aural-overload test; out of over 100 subjects with either normal or abnormal hearing tested in this laboratory, overload thresholds were established quite easily unless the loss was of an extreme severe nature at all frequencies employed.

Sokolowski (*13*) applied a technique for measuring aural harmonics to the diagnosing of recruitment. He presented a 500 cps fundamental tone to the ear by air conduction and an exploring tone of 1003 cps by bone conduction, thus producing beats in the ear of the subject. He found that in normal subjects beats appeared at a sensation level of 45 to 50 db in the fundamental tone. In losses of a conductive type, the threshold of beats was at the same level above the subject's threshold. However, in perceptive losses with recruitment, Sokolowski found the overload threshold to be only slightly higher than the intensity of the 500 cps fundamental tone, provided the extent of the loss exceeded 45 to 50 db.

Opheim and Flottorp (*8*) recently published aural-overload results on 21 normal-hearing subjects and 116 patients with various types of losses. Using fundamental frequencies of 250 and 500 cps and the exploring-tone method of testing, they found that patients with verified conductive-type losses had overload thresholds no lower than in the normal ears. However, in 70 out of 73 ears with monaural hearing losses and evidence of recruitment, markedly restricted ranges were found. The authors conclude that on the basis of this correlation, the aural-overload procedure is of value in the diagnosis of recruitment.

Although employing fundamental tones of a higher frequency than Sokolowski and Opheim and Flottorp, Lawrence and Yantis (7) confirmed their observations. The mean range of linearity of the normal ears and the ears with a conductive loss reported by the latter are very similar to those of Sokolowski. Out of 17 abnormal ears with cochlear involvement tested with the aural-overload test at 1000 cps, Lawrence and Yantis were able to administer either the alternate monaural or binaural loudness-balance test to 12 of them. Of these, eleven had definite recruitment and one partial recruitment. The mean dynamic range in the 11 ears with positive recruitment was only 11 db at this frequency. At 2000 cps, 16 out of 24 ears could be given the loudness-balance test; 13 of these showed definite recruitment and three demonstrated it partially. The mean dynamic range was 16 db in the 13 tested with positive recruitment. Thus, those ears having definite recruitment consistently had an overload threshold much lower than the normal mean.

It should not be concluded on the basis of present evidence that the aural-overload technique is an objective diagnostic test of loudness recruitment. However, the evidence presented so far shows that the presence of the recruitment phenomenon is intimately related with an abnormally restricted range of linear response as well as cochlear involvement. Moreover, the overload tech-

nique may be used effectively with almost every type of loss, whereas the traditional tests for recruitment cannot always be so applied with reasonable success.

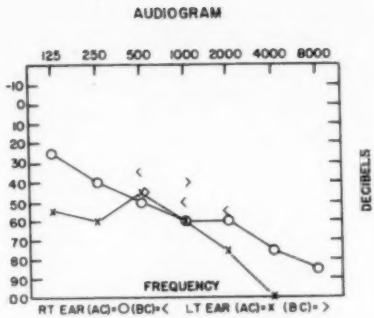
*Selection of Hearing Aids.* It is often recognized that those patients having the greatest difficulty in the effective use of hearing aids are those who have a perceptive-type loss. It is reasonable to account for this, at least in patients with inner-ear involvement, because of the characteristically restricted dynamic range of response to sound in these individuals. Aural distortion is introduced at a much lower level above threshold than in those with a conductive loss or in those, it is presumed, with an involvement of the auditory nerve alone. It would seem, therefore, that the aural-overload test may be of value in discerning those ears which would overload at an abnormally low level. Thus, important information would be added to results obtained by other techniques employed to determine the prognosis for the use of electronic amplification.

*Prediction of Susceptibility to Acoustic Trauma.* Lawrence and Blanchard (*6*) suggested the use of the aural-overload test for the detection of normal ears which might most easily be damaged by excessively loud sounds. They indicated that distortion and trauma occur at the same anatomical locus, the hair cells, and that it is the amplitude of sound vibration that is responsible for both of these effects. The overload threshold in a number of subjects with normal audiometric thresholds was measured and the range from audibility to overload was found to vary over a considerable range. This same large variation in normal ears was reported by Lawrence and Yantis (7), who found individual ranges of linearity from 5 to 80 db at 1000 cps and from 5 to 90 db at 2000 cps. Lawrence and Blanchard made the interpretation that normal ears with the shortest range, *i.e.* those that overloaded at the lowest sensation level, would be most susceptible to damage by loud sounds. In a small number of animals, they showed that the ears most readily damaged were those that took the least amount of sound (above 700 cps) to overload the ear. The need for validation of these conclusions on a large number of animals and human subjects is obvious. Such studies are now being conducted on animals in this laboratory, and programs are being formulated in collaboration with various industrial concerns and military agencies for large-scale human studies.

## Research Applications

The locus of the pathological effects of such conditions as Ménière's disease and acoustic trauma has been found to occur in the inner ear (*19*, *21*). However, the locus of aural pathology occurring as a result of such conditions as presbycusis, streptomycin and dihydrostreptomycin toxicity, lues, rubella, high fever diseases, congenital deafness, *etc.*, is not definitely known and, in some cases, such information is being actively sought.

One of the major problems of investigations of this sort has been in differentiating the locus of the lesion involved between the inner ear and the eighth nerve. This problem is somewhat eliminated through electrical potential studies on animals, but it still remains in human research.




AURAL OVERLOAD DATA

| FREQUENCY | RIGHT EAR 1000 | RIGHT EAR 2000 | LEFT EAR 1000 | LEFT EAR 2000 |
|---|---|---|---|---|
| AUDIOMETRIC THRESHOLD | 60 | 60 | 60 | 75 |
| OVERLOAD THRESHOLD | 85 | 90 | 90 | 105 |
| RANGE | 25 | 30 | 30 | 30 |

DECIBELS

FIGURE 2. Audiometric data from a patient with a perceptive loss due to presbycusis. The monaural loudness balance recruitment test using 500 and 2000 cps in the left ear demonstrated partial recruitment. The db range from threshold of audibility to threshold of aural overload is abnormally restricted in both ears.

As has been mentioned earlier, both the presence of loudness recruitment and an abnormally restricted range of linear response should answer this problem in human testing: both phenomena differentiate the anatomical locus.

As an example of one problem that may arise, let us refer to the problem of presbycusis for a moment. Schuknecht (*10*) has found that in many cases of presbycusis an important contributing factor is a progressive deterioration of the end-organ which starts at the extreme basal end of the cochlea. The presence of the locus of the lesion in the cochlea in losses due to presbycusis seems to be confirmed by the aural-overload results found in the case reported below.

This subject was a 61 year old male who complained of a gradual bilateral hearing loss occurring over a period of ten years. His audiogram (Figure 2) shows a bilateral perceptive loss of 60 db at 1000 cps, and a 60 db and a 75 db loss at 2000 cps in the right and left ears respectively. His loss becomes more severe for the high tones, thus leading to the conclusion that the basal end of the basilar membrane is most involved if the lesion is cochlear. Only a monaural loudness-balance recruitment test between 500 cps and 2000 cps in the left ear was possible; at least partial recruitment was demonstrated. Definite indication of cochlear involvement was shown, however, by the results of the aural overload test. The ranges were 25 and 30 db at 1000 and 2000 cps, respectively, in the right ear and 30 db for both frequencies in the left ear. These levels are significantly lower than the normal means.

In essence, almost any research problem arising in the course of obtaining information on the normal and abnormal physiology of the inner ear would seem to be met to some extent by the procedure outlined in this paper. The fact that the functioning of the organ of Corti itself is involved certainly adds to the value of such research.

## Summary

Some of the audiometric applications of the exploring-tone technique for measuring the thresholds of aural

overload in the human ear are reviewed and discussed. In view of the fact that this test may be employed to detect the malfunctioning of the inner-ear sensory structures, its application in clinical diagnosis and further psycho-physical research is emphasized. Not all of the research and diagnostic applications of this test are covered here. Many await further study and validation. However, enough data have been presented to indicate a definite place for aural-overload testing in audiometric procedure.

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# Incidence Of Stuttering In Older Age Groups

George H. Shames

Howard L. Beams

While the onset and development of stuttering has long been a subject for investigation, research on the duration and changes in the severity of stuttering behavior has never been systematically carried out on any large scale. Little is known about the incidence of stuttering in the adult population, nor is there abundant knowledge as to what happens to stuttering behavior as stutterers grow older.

Observations of the records of various speech clinics have disclosed a noticeable lack of clinic contact with stutterers over 45 years of age. This may be due in part to a general lowering of the incidence of stuttering in middle and old age. It may also be an indication that older stutterers are less inclined to come into a speech clinic either because their stuttering is no longer a problem to them and they have learned to live with it, or because they have given up hope of ever improving their speech. One may have difficulty in recalling from personal experience any large number of older individuals who stutter. However, more objective data is needed before it will be possible to make more definite statements as to the incidence of stuttering in the older population. The collection of such data would appear to be a first step toward an understanding of any correlated changes that may take place in stuttering, as a function of the aging process. Any attempt to make statements concerning the incidence of such a highly specific phenomenon as stuttering would appear to be dependent upon extensive surveys of stuttering behavior throughout the life span. The present paper is a report of such a survey carried out on a relatively small scale.

George H. Shames (Ph.D., University of Pittsburgh, 1952) is Assistant Professor of Psychology and Speech at the University of Pittsburgh. Howard L. Beams (Ph.D., University of Syracuse, 1952) is Assistant Professor of Phychology at the University of Pittsburgh.

## Procedure

In carrying out the proposed survey of the incidence of stuttering in adults it was necessary to impose certain economic limitations of time and personnel. Therefore, it was attempted to obtain a random sample of children and adults in the most parsimonious manner available to the researchers. This meant utilizing subjects who in turn had long term systematic contact with many children and adults.

It was decided to send questionnaires to clergymen for this purpose since they have many opportunities for close contact with large numbers of adults as well as children. In many instances these contacts bring the

TABLE 1. Number and percentage of male and female stutterers in age groups from 3 to 80.

| Age | N | | Present Stutterers | | Percent Of Stutterers |
|---|---|---|---|---|---|
| | Male | Female | Male | Female | |
| 3 to 5 | 404 | 484 | 4 | 4 | .90 |
| 6 to 11 | 874 | 907 | 3 | 1 | .34 |
| 12 to 19 | 649 | 650 | 5 | 5 | .77 |
| 20 to 29 | 572 | 642 | 6 | 4 | .82 |
| 30 to 39 | 906 | 972 | 8 | 3 | .59 |
| 40 to 49 | 842 | 945 | 9 | 4 | .73 |
| 50 to 59 | 517 | 643 | 2 | 1 | .26 |
| 60 to 69 | 338 | 429 | 2 | 0 | .25 |
| 70 to 79 | 155 | 210 | 0 | 1 | .27 |
| 80 | 40 | 78 | 0 | 0 | .00 |
| Total | 5,297 | 5,960 | 41 | 23 | |
| Grand total | 11,257 | | 64 | | .57 |

clergymen in touch with the personal problems of their parishioners, and it would seem likely that they would know whether a problem of stuttering existed in an individual in their congregations.

Each of 150 clergymen was requested to supply first-hand information regarding the incidence of stuttering among members of his congregation. The clergymen were requested to tabulate the number of males and females in their congregation in each of the following age intervals; 3 to 5, 6 to 11, 12 to 19, 20 to 29, 30 to 39, 40 to 49, 50 to 59, 60 to 69, 70 to 79, 80 and above. They were then asked to record the number of stutterers, from first-hand knowledge only, according to age and sex. In addition, information was requested concerning the socio-economic level of the neighborhood in which the church was located.

## Results

Of the 150 clergymen contacted, 50 returned the questionnaires with information regarding stuttering in their congregations. However, of the 50 returned, only the data on twenty-two were used. The lack of information, the use of second-hand knowledge, and the misunderstanding of instructions seemed to invalidate the data on the other 28 returned questionnaires and prohibited their use in this report.

From the 22 usable questionnaires, data were available for 11,257 people. The age breakdown of these individuals is reported in Table 1. The incidence of stutterers in the various age classifications is reported in Table 1 and is presented schematically in Figure 1. Of the 11,257 people in this sample, .57 per cent were identified as stutterers.

It can be seen from this small sample that there seemed to be a definite downward trend in the number of stutterers seen by clergymen from the very young to the very old. They noted the highest percentage of stutterers, .9 per cent, in the 3 to 5 age group. There was a reduction in percentage of stutterers to .34 per cent, at age 6 to 11. From age 12, the percentage of stutterers increased to .77 per cent and held fairly constant until age 49, when there was another large reduction in the percentage of stutterers seen. This reduction held

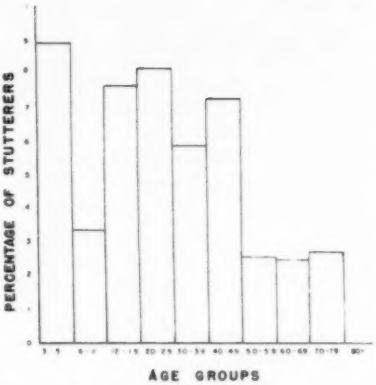


FIGURE 1. Percentage of stutterers seen within each of ten age intervals.

throughout the remaining older age intervals.

The incidence of stutterers for the age intervals from 3 to 19 was .6 per cent. This figure is somewhat similar to the most recent figure available on the incidence of stuttering for this age interval. The report of the Mid-century White House Conference for 1951 revealed an incidence of stuttering of approximately .7 per cent for ages 5 to 21 (*1*). This similarity of figures would tend to support the validity of the clergymen's judgments concerning the presence of stuttering. The average percentage of stutterers from ages 30 to 49 was .65 per cent showing a fairly consistent incidence up to age 49. However, the percentage of stutterers seen after age 49 was only .25 per cent.

The total N, the small percentages, and the small expected incidence of this phenomenon would make tests of statistical significance meaningless. However, the difference between .66 per cent stutterers for ages 3 to 49 and .25 per cent stutterers for age 50 and above would seem considerable.

It might also be noted that a sharp reduction in the percentage of stutterers took place from age interval 3 to 5 to age interval 6 to 11. In percentage terms, about three times as many stutterers were seen in the 3 to 5 age group as in the 6 to 11 age group. However, actually only two more stutterers were seen in the 3 to 5 age group. Because of the small sample, the small absolute difference between the number of stutterers seen in these two age intervals became magnified when translated into percentages.

Of the 64 stutterers identified in this population of children and adults, six of them were age 50 or more, while 58 were under age 50. While there were about four-and-a-half times more people surveyed under age 50 than over age 50, there were almost ten times as many stutterers seen in the younger age group.

In looking at the sex ratio of the stutterers in this population, it can be seen that 41 males and 23 females were identified, or slightly less than two to one in favor of the males.

## Discussion

It is possible that the present data may be a reflection of an actual reduction in the number of stutterers seen in older age groups because of a change in stuttering behavior. On the other hand, the possibility that the population sampled may have been highly selective should be noted, in that it included only people who came in contact with clergymen by virtue of church membership and/or attendance. It is possible that older stutterers do not belong to or attend churches, out of reluctance to engage in group functions, and that the data

are not a reflection of a reduction in stutterers with aging but a reflection of changes in the church attendance and/or membership behavior of stutterers.

The data might also be tentatively interpreted with regard to the longevity of stutterers. One might postulate that the long-term, chronic emotional and physical strains of stuttering result in a shorter life span, and that the reduction in the number of stutterers seen in these older age groups again does not reflect an actual change in stuttering behavior.

However, the original purpose of this study was to make a preliminary exploration which might provide background information concerning changes in stuttering behavior associated with aging. It is recognized that as people advance through early adulthood to later maturity and old age, changes take place in their values, family make-up, social behavior, attitudes, vocational status, economic situation, and health. These changes which are commonly associated with aging embrace a variety of factors which might be related to the perpetuation or spontaneous arrest of the problem of stuttering. The data gathered in the present survey, showing a drop in the incidence of stuttering with aging, lend some support to the possibility that such relationships exist. Although the size of the sample does not permit the data to be considered universal or wholly representative, the results are considered positive enough to encourage more extensive surveys of the phenomenon of stuttering in older age groups.

It would also seem that in addition to the information which could be obtained through cross-sectional surveys, information could be gathered through intensive longitudinal case studies which followed stutterers for a number of years. This information would be used to determine whether changes in severity or duration actually take place, and to determine what the correlates to these changes are.

## Summary

The present paper was a report of a survey of the incidence of stuttering in a randomly sampled population of 11,257 children and adults. The survey procedure made use of the opportunities afforded clergymen for coming in close contact with their congregations. Twenty-two clergymen submitted usable data, showing an overall incidence of .57 per cent of stutterers. There was a definite downward trend in the number of stutterers seen in the older age groups, to the extent that the clergymen as a group saw about two-and-a-half times as many stutterers, percentage-wise, in the younger age group as in the older group.

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# Relationship Of Parental Attitudes To Development Of Speech Problems

Jane Beasley

Professional people concerned with helping children are in agreement, as a rule, that parents are key figures in the child's situation, not only in the problems he may have, but also in the progress he is able to make. This paper will call attention to certain cause-effect relationships thought to exist between parental attitudes and occurrence of language and speech problems. Some issues will then be considered which are related to the parent work carried on by a speech and hearing therapist. Suggestions for counseling will be discussed in the final section.

*Effects of Parental Attitudes.* Since a child develops communication in an interpersonal setting, speech or language difficulties inevitably mean that he has encountered emotional stress within his family deeper or different from that of a child who has developed adequate speaking skill. Disorders such as mutism, faulty articulation, or stuttering may have occurred as a child's way of coping with unfavorable attitudes and treatment from family members. Disorders of other kinds, as those associated with cleft palate, hearing loss, or brain injury, may have been aggravated in the child as much by the expectations, disappointments and anxieties of the family members as by the original organic involvement (*1*).

According to McCarthy (*5*), a number of investigators of language point to an emotional and functional explanation of most of the language disorder syndromes and indicate that the disturbances are for the most part environmentally determined. Exponents of this theoretical position, notably McCarthy (*6*, 7), Sullivan (*10*), Wyatt (*11*), Goldfarb (*2*), and Ribble (*9*), have emphasized particularly the possible effects of the mother-child relationship in the establishment of early vocalization and the ensuing enrichment and refinement of sounds. These writers and others, such as Lewis (*4*), Langer (*3*), and Mowrer (*8*), have explored the emotional coloring and non-logical characteristics of beginning sounds. They hold that rudimentary stabilized word forms are not attached to particular events, objects, or persons. Rather these word-forms represent the infant's attempt to call back the surprise, pleasure, or affection the mother has shown. If the infant should meet with indifference, particularly between the twelfth and eighteenth month, his sound combinations may remain variable and tenuous or tend to disappear altogether.

Jane Beasley (Ed.D., Teachers College, Columbia University, 1955) is Research Associate, Horace-Mann Lincoln Institute of School Experimentation and Instructor, Psychological Foundations, Teachers College, Columbia University. This article is adapted from a paper presented at the 1955 Convention of the American Speech and Hearing Association in Los Angeles.

As the child develops, his growth in language continues to be in large measure, a response to the kind of interpersonal climate around him. It is hypothesized that freedom and spontaneity in talk are more likely to exist if he meets with flexibility and encouragement in all his early experimenting and exploring, and that unevenness and distortion are more likely to appear if he encounters rejection or exacting pressures from people significant to him. These causative factors affecting language are then reinforced by the child's verbal shortcomings. Interference with the normal development of language disturbs his equilibrium and that of his family in several ways: The child is deprived of much of the richness and warmth in relationships which come about through satisfying verbal interchange. He is isolated from the comfort of having what he says understood and approved by people important to him. Furthermore, he is penalized by the rejecting effect of well-meaning admonitions to talk better and by the amused ridicule to which he is sometimes exposed. The family in turn may become concerned and over-solicitous, thereby increasing demands on the child to talk differently. Such demands deepen the dependent patterns which the child finds somewhat necessary. As parents search for assistance for the child's condition, they may be motivated as much by their own guilt feelings and their need to direct blame elsewhere as they are by their desire to obtain help for the child. At best the emotional climate is a charged one, intensified year after year by the cultural expectations placed on both the parents and the child by relatives, neighbors, and eventually school personnel.

*Issues in Parent Counseling.* From this assumption concerning the influence of the parent-child relationship on the development of language and speech problems, it would follow that parents who want clinical assistance for their child often need it themselves. Such assistance is often essential if the equilibrium of the household is to be brought into better balance for the child. In examining the work that might be done with parents in a speech program, two professional considerations merit some attention.

First, parent work is still a new venture for many speech and hearing therapists. Its scope has not been clearly formulated as yet. Many are still unsure of whose job parent counseling is, how one goes about it, how time for it can be found, and what is considered adequate professional background for the counselor. Procedures with parents vary from the fairly common ones of suggesting how they may help their child's speech at home or presenting information about speech disorders to the less common one of providing a therapeutic-like climate wherein parents discuss their own feelings and struggles. In some instances, contacts with parents are made only briefly on the occasion of the child's enrollment and dismissal from speech class. In other instances, lengthy interviews are provided or parents are actively involved in the child's education or therapy. The range of opinions regarding what constitutes satisfactory and appropriate help is very broad.

Secondly, the expectations for parents vary widely among those who counsel them. Some workers recognize the fact that the problems of parents are of long-standing and cannot be eradicated easily, if at all. They see that significant changes in parental

attitudes will be brought about slowly and painfully, and that a few nostrums will have little effect on the long-range picture. Other equally realistic workers, understanding that human problems are amenable to change, believe that someone, be it a friend, teacher, counselor, or speech therapist who has faith in the possibility of change can serve as a successful therapeutic agent.

These issues will require thought and planning for some time to come. Appropriate psychological and social agencies, increasing in number throughout the country, are extending their services in this direction. Colleges and universities will be broadening their course offerings to include work in counseling, guidance, and parent education for the therapist in training. In the meantime, many therapists who are concerned with the relationship of the child's speech to his total situation will be talking with parents and providing any assistance they can. Certain attitudes are considered basic to such assistance, and are suggested in the ensuing section.

*Attitudes in Counseling.* The components of the relationship between the speech therapist and the parent are not essentially different from those comprising the relationship between the speech therapist and the child. These may be said to involve *respect* for the parent's present functioning, *understanding* of their need to preserve their defenses whatever they may be, *acceptance* of the parents as people of worth in their own right, *sensitivity* to parent's feelings of hope and despair, and *compassion* for their situation.

While such qualities may be thought of as intrinsic to any parent counseling, their real significance is frequently concealed in the worker's sincere efforts to be objective and to function as an authority who can be of help to parents. Assuming this authoritarian role is apt to place the therapist in the position of an expert who knows answers, knows better, knows more. He becomes one who should advise on the best theories and methods of child-rearing, who can furnish intellectual information about speech disorders, prescribe home treatment and furnish reassurance for parents. This is a big order, and yet many who have embarked on the task of helping parents have set just such high standards for themselves. The therapist's involvement in proving his competency to himself and others may serve to blur his view of the parents' predicament. In the emphasis on *what* he is to say he easily loses sight of the *people* to whom he is talking. Parents are likely to feel inadequate anyway when their child's speech is disordered. They may come away from a discussion with a speech therapist feeling bewildered by the amount of advice they have been given, inferior about their handling of their child, and anxious or hostile about carrying out instructions incompatible with their own beliefs. Such efforts may serve to make worse what was already an undesirable home atmosphere.

In contrast, if the worker can view himself less as an authority and more as one who joins parents in seeking a better understanding of the child and how he can be helped, a somewhat different role emerges that is easier in certain respects. The therapist reaches out to parents as people who are operating in the best way they know at the moment, who probably have a lowered sense of self-worth because of the difficulties the child is having, and who have need to express their doubts and uncertainties.

The therapist should understand that parents may wish to hold to their own regimes of discipline and standards and to experience acceptance of the job they are doing.

The therapist should listen to what people are saying—really listen—and attempt to follow the emotional import of the topics parents choose to raise, the problems they describe, the observations they make about their child, and the relationships among family members on which they comment.

The therapist also should attempt to clarify questions parents raise. Parents ask many questions, although they are often threatened by the answers and may hear only what they want to hear or can tolerate hearing. Certain questions merit simple, factual answers, of course. Certain other questions, often unanswerable, represent more a need for support and encouragement than for information. Parents may inquire about length of treatment and eventual outcomes, but have considerable difficulty handling the reality situation of the here and now. When parents ask, 'Will our child's speech ever be normal?' sometimes the best reply is another question, 'What changes have you yourselves noticed in the past three months?' Their query, 'What ought we be doing to help?' which so easily calls forth the therapist's preconceived ideas about ideal family instruction and shuts off the individual resourcefulness of parents can be more profitably turned to 'What ideas have you had that seem to be paying off?' When parents ask what speech they should work on at home with the child, it is often valuable to inquire what speech the child is using at home that could be profitably worked on in speech class. These functions can serve to increase the therapist's knowledge about the child and to decrease the threat to the parents of the expert's opinion.

In conclusion, even though parents are seen only briefly or occasionally by a speech therapist, the kind of relationship he establishes with them may serve as an example for parents in their relationship with their child. To the extent that parents themselves are granted acceptance and respect they will be more free to give this to their child. If the therapist attempts to understand the parental situation instead of evaluating it or forcing change, they will be more free to seek understanding of their child's predicament, less likely to impose additional pressures on him. As the parents gain some small sense of their own worth because they are viewed in a positive way by the therapist, they will be more able to perceive their child favorably.

Since the problems of a child in language and speech originate and exist in an interpersonal setting, modifications of this environment may be highly important if change in speech is to take place. The viewpoint presented here has suggested that the speech therapist's knowledge and understanding of parents can do much to bring this about.

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# Sibling Influence On Children's Speech

Helen L. Koch

This study deals with a limited aspect of the problem of sibling influence on children's speech. Attention was focussed on the relation of some speech characteristics of the young child with one sibling to the age difference which separated the child and sibling, and to the sex and ordinal position of the latter. The speech characteristics considered were voice volume, talkativeness, amount of stuttering, and preciseness of articulation. Sex differences in these speech characteristics were also investigated. This study was part of a larger investigation dealing with the effect of certain sibling characteristics on the personality of the young child.

## Procedure

The subjects were 384 five- and six-year-olds from white, urban, native-born, intact, two-child families. They were divided into 24 matched subgroups of 16 children each. Three levels of inter-sibling age disparity were studied (child and sibling differing in age by under two, by two to four, or by four to six years) for each of the following eight classes: boys with an older brother, boys with a younger brother, boys with an older sister, boys with a younger sister, girls with an older brother, girls with a younger brother, girls with an older sister, girls with a younger sister. The data were analyzed by means of an analysis of variance procedure. The 24 subgroups were matched individual by individual on the basis of age, the socio-economic class of the father's occupation (*6*), and the neighborhood of residence of the family (*10*). Ninety-eight per cent of the individual matchings in age were within six months, 93 per cent within one level on the occupation scale, and 88 per cent within one rank on the neighborhood scale. Level 4 on the occupation scale, the farming group, was omitted since all the subjects were urban children. A detailed description of the groups has been reported elsewhere (*8*). It should be noted that the second-borns in this study remained the youngest in their sibships; hence they may differ from second-borns who have younger siblings.

The measures of speech and voice characteristics were teachers' ratings on a graphic scale. The descriptions of three levels for each trait were borrowed from the California Behavior Inventory for Nursery School Children (*1*). The ratings on the graphic scale were converted into scores on a nine-point scale. These scores were then normalized (4.00 was taken as the mean) on the basis of a sample of 498 five-and six-year-olds, of which the subjects of this study formed a part.

Helen L. Koch (Ph.D., University of Chicago, 1921) is Professor of Child Psychology, University of Chicago.

TABLE 1. Means of the normalized ratings of speech characteristics for the various basic subgroups.

| *Description of Groups* | | | *Age Separation of Siblings in Months* | | | |
|---|---|---|---|---|---|---|
| *Subject's Sex* | *Sibling's Sex* | *Subject's Position in Sibship* | *7–24 (N=16)* | *25–48 (N=16)* | *49–72 (N=16)* | *Total (N=48)* |
| | | | *Means of Normalized Ratings* | | | |
| | | | *Amount of Vocalization* | | | |
| M | M | 2 | 3.848 | 4.183 | 4.354 | 4.129 |
| M | F | 2 | 4.111 | 3.980 | 4.067 | 4.053 |
| F | M | 2 | 3.973 | 3.815 | 3.685 | 3.824 |
| F | F | 2 | 3.905 | 3.937 | 3.717 | 3.853 |
| M | M | 1 | 3.960 | 4.106 | 4.329 | 4.132 |
| M | F | 1 | 3.562 | 4.751 | 4.327 | 4.213 |
| F | M | 1 | 4.175 | 4.038 | 4.282 | 4.165 |
| F | F | 1 | 3.833 | 4.149 | 3.829 | 3.937 |
| | | | *Tendency to Stutter* | | | |
| M | M | 2 | 3.978 | 4.258 | 4.522 | 4.253 |
| M | F | 2 | 4.281 | 4.146 | 4.042 | 4.156 |
| F | M | 2 | 3.903 | 3.891 | 3.760 | 3.851 |
| F | F | 2 | 3.860 | 3.807 | 3.793 | 3.820 |
| M | M | 1 | 4.262 | 3.848 | 3.928 | 4.013 |
| M | F | 1 | 4.048 | 4.246 | 4.617 | 4.304 |
| F | M | 1 | 3.568 | 3.670 | 4.107 | 3.782 |
| F | F | 1 | 3.875 | 3.956 | 3.662 | 3.831 |
| | | | *Loudness of Voice* | | | |
| M | M | 2 | 3.983 | 4.270 | 4.118 | 4.124 |
| M | F | 2 | 3.726 | 4.098 | 4.215 | 4.013 |
| F | M | 2 | 3.751 | 4.108 | 4.069 | 3.976 |
| F | F | 2 | 4.067 | 4.068 | 3.711 | 3.949 |
| M | M | 1 | 3.948 | 4.335 | 4.206 | 4.163 |
| M | F | 1 | 3.810 | 4.746 | 4.147 | 4.234 |
| F | M | 1 | 4.366 | 4.233 | 4.018 | 4.206 |
| F | F | 1 | 3.665 | 4.039 | 3.995 | 3.900 |
| | | | *Articulation* | | | |
| M | M | 2 | 3.493 | 3.958 | 3.994 | 3.815 |
| M | F | 2 | 3.114 | 3.696 | 4.139 | 3.649 |
| F | M | 2 | 4.106 | 3.940 | 3.881 | 3.976 |
| F | F | 2 | 3.968 | 3.514 | 4.028 | 3.837 |
| M | M | 1 | 3.918 | 4.108 | 4.450 | 4.159 |
| M | F | 1 | 3.967 | 4.208 | 4.181 | 4.119 |
| F | M | 1 | 4.204 | 4.304 | 4.255 | 4.254 |
| F | F | 1 | 4.155 | 3.877 | 4.489 | 4.174 |

The individual matching procedure made possible what may be viewed as 16 replications; however the replications variance was in no case significant. In the light of this consideration, the within groups variances have been used as the error terms in Tables 2 through 5. All interactions were tested for significance but only those significant at the five per cent point or better are presented in Tables 2 through 5. Futhermore, for the purpose of simplification all non-significant interactions are combined.

TABLE 2. Analysis of variance testing differences between sibling characteristics with respect to amount of vocalization.

| *Source* | *df* | *ss* | *ms* | *F** |
|---|---|---|---|---|
| Sex (S) | 1 | 3.354 | 3.35 | 3.81 |
| Sibling Sex (SS) | 1 | .347 | .38 | |
| Ordinal Position (OP) | 1 | 1.764 | 1.76 | |
| Spacing (Sp) | 2 | 2.445 | 1.22 | |
| Interactions pooled | 18 | 15.475 | | |
| Within groups | 360 | 318.843 | .88 | |
| Total | 383 | 342.228 | | |

*The within groups mean square was employed as the error term for computing $F$. $F_{.05}$ (df = 1 and 360) = 3.86;

*$F_{.05}$ (df = 2 and 360) = 3.02. Only $F$-ratios significant at or beyond the 5% level are reported.

The following traits were rated by teachers who had had from four to nine months contact with the subjects judged: the amount of the child's vocalization, the degree of excellence of his articulation, the extent to which he stuttered, and the volume level of his voice. If stuttering occurred, its frequency and severity were taken into account in the ratings.

## Results and Interpretations

Boys were judged to talk and to stutter more than girls (Tables 1, 2, and 3). This latter finding is somewhat in line with the findings of other investigators (*2*, *3*, *4*, 7, *12*, *13*, *14*) who have reported more stuttering in boys than in girls. However, the third-order interaction was significant in the case of stuttering (Table 3). Girls with a younger brother and boys with a younger sister tended to increase in tendency to stutter as the age difference between the sibs expanded. In like-sex pairs among first-borns, the trend was, if anything, in the opposite direction, *i.e.*, children with an infant or near infant sib of their own sex tended to stutter relatively little. Among second-borns there is a conspicuous increase in stuttering with sib spacing on the part of boys with an older brother. Of the children with siblings differing 49-72 months in age, the boys with an older brother were judged to stutter more than the boys with a younger brother; boys with an older sister were judged to stutter less than boys with a younger sister. (Tables 1 and 3).

It is interesting that first-borns in opposite-sex sibling pairs increase in stuttering with age difference. Possibly those in opposite-sex pairs defend themselves against the sibling more by verbal means than do those in the same-sex pairs. The younger the sibling is, the more the older child is blocked or discouraged from attacking forcefully, if the sib attacks or thwarts. Frustration may result in much incoordination and this incoordination may be reflected in speech.

Boys with a sister up to three years of age were found to stutter more

TABLE 3. Analysis of variance testing differences between sibling characteristics with respect to tendency to stutter.

| *Source* | *df* | *ss* | *ms* | *F** |
|---|---|---|---|---|
| Sex (S) | 1 | 12.056 | 12.06 | 14.71 |
| Sibling Sex (SS) | 1 | .337 | .34 | |
| Ordinal Position (OP) | 1 | .097 | .10 | |
| Spacing (Sp) | 2 | .490 | .24 | |
| S x SS x OP x Sp | 2 | 6.456 | 3.23 | 3.94 |
| Other interactions pooled | 16 | 6.131 | | |
| Within groups | 360 | 293.613 | .82 | |
| Total | 383 | 319.180 | | |

*The within groups mean square was employed as the error term for computing $F$. $F_{.05}$ (df = 1 and 360) = 3.86; $F_{.05}$ (df = 2 and 360) = 3.02. Only $F$-ratios significant at or beyond the 5% level are reported.

than boys with a sister who is four to six years older. This again may be due to the degree to which the sib frustrates and the frustrations are allowed to be expressed in vigorous overt reactions. An older boy with a much younger sister may be forbidden to be rough with her. This prohibition may not be so strictly enforced if the sib is a younger brother, since the latter is expected to be toughened some. Also, the boy with a much younger sister may be jealous of her because of the fondling she receives and this may intensify his conflict. On the other hand, if the sister is older, the prohibition to attack does not obtain to any extent. Moreover, if she is much older she may react almost maternally toward him and arouse little hostility. This may account in part for the fact that of the children with a sibling 49-72 months older, the boys with an older sister were rated lower in stuttering than the boys with an older brother. That the boys with an older brother should stutter more than boys with a younger brother may result from the threat of the older brother and his friends. They are doubtless rough with the younger brother, increasingly perhaps as the mother appears to favor the younger boy. The younger boy probably does not dare to counterattack much physically and his defenses then must be chiefly oral. Hence the incoordination caused by his feeling of inadequacy in relation to his sibling may show in his speech. If the brother is much younger, on the other hand, he is no physical threat.

That the girl with a much younger brother stutters more than one with a much younger sister might be the result of jealousy and conflict over sex status. If the sib is considerably younger, the older girl has had her mother's full attention for many years. When the mother turns her attention to the baby brother on his arrival, and the girl hears comments on the merits of boys and experiences a greater criticalness at the hands of her mother (*9*), the sensitive girl may be deeply wounded. The same sort of

TABLE 4. Analysis of variance testing differences between sibling characteristics with respect to loudness of voice.

| *Source* | *df* | *ss* | *ms* | *F** |
|---|---|---|---|---|
| Sex (S) | 1 | 1.701 | 1.70 | |
| Sibling Sex (SS) | 1 | 1.107 | 1.11 | |
| Ordinal Position (OP) | 1 | .887 | .89 | |
| Spacing (Sp) | 2 | 5.814 | 2.91 | 3.20 |
| Interactions pooled | 18 | 11.483 | | |
| Within groups | 360 | 327.828 | .91 | |
| Total | 383 | 348.820 | | |

*The within groups mean square was employed as the error term for computing $F$. $F_{.05}$ (df = 1 and 360) = 3.86; $F_{.05}$ (df = 2 and 360) = 3.02. Only $F$-ratios significant at or beyond the 5% level are reported.

TABLE 5. Analysis of variance testing differences between sibling characteristics with respect to articulation.

| *Source* | *df* | *ss* | *ms* | *F** |
|---|---|---|---|---|
| Sex (S) | 1 | 1.287 | 1.29 | |
| Sibling Sex (SS) | 1 | 1.108 | 1.11 | |
| Ordinal Position (OP) | 1 | 12.166 | 12.17 | 15.02 |
| Spacing (Sp) | 2 | 6.664 | 3.33 | 4.11 |
| S x Sp | 2 | 6.669 | 3.33 | 4.11 |
| Other interactions pooled | 16 | 7.932 | | |
| Within groups | 360 | 290.019 | .81 | |
| Total | 383 | 325.845 | | |

*The within groups mean square was employed as the error term for computing $F$. $F_{.05}$ (df = 1 and 360) = 3.86; $F_{.05}$ (df = 2 and 360) = 3.02. Only $F$-ratios significant at or beyond the 5% level are reported.

conflict over sex status may be responsible for the fact that of the children with a sibling 49-72 months younger the boys with a younger sister are given more to stuttering than are the boys with a younger brother.

Loudness of voice, according to the ratings, varies significantly with the magnitude of the age difference between the subject and his sib (Tables 1 and 4). Those children who differed from their sibling by two to four years in age tended to talk more loudly than those whose age differed from their sibling's by less than two, or from four to six years. The finding that first-born males at the two-to-four-year spacing speak with much force was expected. Speaking loudly seems likely to be, in part, a habit which has generalized from an effort on the part of the child to make himself noticed. If a child is between five and seven years and its sib is two to four years younger, the latter gets must attention, approval, and protection. At the same time, the younger child interferes with the activities and possessions of the older child without offering much compensating companionship, as does the sibling close in age. Boys are particularly likely to be frustrated by such a sibling. Were the sibling an infant, it would interfere little. The older child, too, is at an age when parents tend to treat him more critically and less warmly than had been their wont (*9*). Parents caution the former endlessly to be gentle with and to refrain from attacking the younger child. The older child, in the face of this situation may attack verbally relatively more and may shout in order to bring the younger child to terms. This habit may generalize and cause the voice intensity level to be relatively high.

If, on the other hand, the sib is much older, physical attacks on him, while not forbidden, are likely to be infrequent. The younger child will defend and keep himself on the scene by verbal means. What he lacks in strength he may compensate for by loudness of voice.

Articulation shows more complex relations with sibling characteristic factors than voice volume. Significant relations are those with ordinal position, sibling age difference, and the interaction between subject's sex and age difference (Tables 1 and 5). First-born children articulate consistently better than do second-born children. This relation is to be expected, since adults are virtually the formers' only companions in their early speech-forming years, whereas a child with an older sibling also has the latter as a model. McCarthy (*11*) and others have found that only children who have adults as models primarily tend to be superior in language development. The tendency for articulation to be better with greater sibling age difference may be attributed in part to the decrease in sibling contact as the age difference between the siblings increases. As a result, adults become, with greater consistency, the speech models for the child. Moreover, the older the sibling is the more mature his speech pattern tends to be.

While girls at the closest spacing (especially second-borns) articulate better than do boys, no sex difference is observed at the wider spacing (Tables 1 and 5). Girls, perhaps, tend to be more adult-oriented than boys. Other ratings made by the teachers, which are not presented here, reveal that the girl subjects were more friendly to adults than boys when the age difference between the former

and their sibling was small. When siblings differ much in age, the adult is probably to the same degree the model for both sexes. Both Davis (*5*) and Wellman (*15*), who studied the question of sex differences in articulation in young children, reported that girls tend to surpass boys in this ability.

## Summary

The investigation was concerned with the relation between certain speech and voice characteristics in young children from two-child families and sibling influence. Three hundred and eighty-four five- and six-year-olds from white, urban, native-born, intact, two-child families were divided into 24 groups of 16 each and matched on the basis of age of child, class of father's occupation, and neighborhood of residence. These 24 groups represent every possible subject's-sex sibling's-sex combination for two ordinal positions and three levels of sibling spacing. The measures of voice and speech characteristics were teachers' ratings. Boys were discovered both to talk and to stutter more than did girls but the third-order interaction in the case of stuttering was significant. When the age difference between the siblings was large, first-born children whose sibling was opposite in sex tended to stutter more than was the case when the sibling differed little in age. In parallel like-sex pairs the trend was reversed. In boy-boy pairs among second-borns, stuttering increased with sibling spacing, whereas among girl-boy pairs it decreased. Those children who differed from their sibling by two to four years in age tended to speak more loudly than did children from sibling pairs in which the age spacing was either under two years or more than four. First-born children were judged to articulate better than second-born. The wider the age difference between a child and his sibling, the better the former's articulation tended to be. Girls, when the sibling was near in age, tended to articulate better than boys; but at the wider spacings, no sex difference in this skill was apparent.

## Acknowledgments

The investigation was supported, in part, by a grant from the National Institute of Mental Health, of the National Institutes of Health, Public Health Service, and, in part, by the Sonia Shankman Orthogenic School Research Fund, University of Chicago. The author wishes to acknowledge the help received from, and to express her gratitude to, the teachers and principals of the following schools in Chicago which participated in the study: Bennett School, Bradwell School, Field School, Holmes School, Gunsalus School, Luella School, Perry School, Schmid School, Sullivan School, Wentworth School, University of Chicago Laboratory Schools, and the University of Chicago Nursery School. The author is also much indebted to Dr. Grace Munson and Dr. Thelma G. Thurstone, both formerly Directors of the Bureau of Child Study, Chicago Public Schools. Dr. Helen Heath did most of the statistical work for the study.

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# Research In Articulation Disorders And Personality

Duane C. Spriestersbach

Organized research in speech pathology covers a period of about 35 years. During the early part of this period, considerable interest was shown in the etiology of speech defects and especially in those etiological factors which could stem from a defective organism. This interest is not surprising; it simply paralleled the thinking of the day in the field of the behavioral sciences. Furthermore, as Sanford (*13*) points out, language has been regarded as the 'vehicle.' It was not until interest was aroused in the *functional* importance of language to the organism that attempts were made to study the relationship between the communication vehicle and the organism.

During the last few years, considerable interest has been evidenced in the study of the communicative process itself, especially those aspects of the process which tend to reduce its effectiveness. With this interest has come the increasing awareness that communication must take place between people who, as dynamic, responsive organisms must, themselves, be understood if the communication which takes place between them is to be understood.

Two types of speech disorders which have been studied especially from this point of view have been stuttering and voice disorders. In line with the thinking of the day, experimenters interested in stuttering began by studying the organism. However, when these efforts were not particularly productive, interest began to be focused on the 'psychological' aspects of the problem.

To a lesser degree, voice problems were approached in a similar fashion. Here there were some observable, measurable pathologies but the large bulk of the problems could not be explained by observing the vocal folds. Again, the researchers ultimately turned to a consideration of the 'psychological' aspects of the speaker.

The pattern has been much the same in the fields of aphasia, cleft palate, and the hard-of-hearing. While in these instances a defective mechanism may be a very important parameter of the problem, evaluation and study of such mechanisms apart from the individual inevitably fail to tell the whole story. Only in the very recent past has emphasis been given to viewing the brain damaged, the individuals with cleft palates, and the hard-of-

Duane C. Spriestersbach (Ph.D., State University of Iowa, 1948) is Associate Professor of Speech Pathology and Audiology, State University of Iowa. This article is adapted from a paper presented at 1955 Convention of the American Speech and Hearing Association in Los Angeles.

hearing as people first, with aggressions, disappointments, and hopes.

These common trends of research in the many varied fields within speech pathology and audiology point up once more the falseness of the dichotomy between 'organic' and 'functional' problems and serve as reminders that the differences which exist among the fields are largely of degree rather than kind.

But where do the so-called 'functional' articulatory disorders fit into this history? The answer is that research geared to assess the impact of this disorder on the speaker has been largely ignored. It is not too clear why this is the state of affairs. Certainly the study of the somatic variables has not been especially rewarding to the researcher in this instance. For example, studies have been made of such things as the diadokokinetic rates, intelligence, and dental alignment of individuals with faulty articulation. While these studies have contributed some information, they have, more importantly, pointed up the fact that such factors furnish only a fractional part of the etiological picture. Nor can lack of interest be attributed to the lack of material, for articulatory disorders have constituted the bulk of the speech pathologists' clinical load.

Perhaps the lack of interest in the psychological aspects of the 'functional' articulatory problem parallels a general lack of interest, particularly research interest, in this type of case. These have been dubbed the 'simple' cases, the cases to be given to the inexperienced clinician, the 'obvious' cases about which little more is to be known. Frequently it would appear that the researcher assumes that if he is to make important contributions in the field of speech pathology he can do so best by studying the 'complex' problems. Yet clinics abound with articulatory problems. Meanwhile, clinicians look for new 'gimmicks' to use in working with the problems, contenting themselves with a record of improvement in the effectiveness of therapy which leaves much to be desired.

In his more reflective moments, of course, the speech pathologist has recognized that, favorably or unfavorably, speech or communication has a personal backwash. He understands that one does not mouth words into a psychological ether or void. He realizes that the speaker talks because he has a need to communicate, because he wants to influence behavior other than his own. Communication, then, typically includes at least two people, and the response of the listener or listeners is of crucial importance to the speakers. Any disturbance in this vital process can only lead to frustration which, consistently experienced, can only result in maladjustment for the person attempting to communicate. This logic, pursued to its ultimate conclusions, would appear to say that a speech disorder which does not have a psychological impact on the speaker is not a disorder of any consequence since communication is apparently proceeding without difficulty. In reality, it is another way of saying that 'a difference to be a difference must make a difference' (*6*), or that a speech disorder to be a disorder must divert at least some of the listener's attention to how the speaker is speaking at the expense of attending to what he is saying.

To the extent, then, that these notions are valid the groundwork has

been laid for the possible finding that a speech disorder, and in this context specifically an articulatory disorder, may cause such psychological repercussions within the speaker that maladjustments will be the probable consequence.

It must be recognized, of course, that a 'chicken or the egg' argument, or perhaps more appropriately, 'the chicken *and* the egg' argument is involved here. Is the articulatory defect the result of some basic personality maladjustment of the speaker or does the defect cause the maladjustment?

*Articulatory Disorders as a Cause of Maladjustment.* A variety of statements in some of the standard textbooks imply or state directly that articulatory disorders may result in maladjustments. For example, in *Speech Handicapped School Children* (*6*) it is said that anxiety and frustration resulting from the presence of the defect operate to maintain the defect. In *Speech Problems of Children* (7) it is suggested that the speaker must learn to accept and live with the problem, the speaker must be accepted by the clinician, and the school must avoid making the speech defective child feel inferior. Berry and Eisenson (*2*) quote from a study by Templin (*14*) to the effect that speakers with articulatory defects tend to be less aggressive than normal speakers and speakers with several other types of speech defects.

The potential psychological effect of a speech defect upon the speaker has been demonstrated in the recent study by Perrin (*11*). In this study a group of children with speech defects, the majority of which were articulation problems, was found not to be readily accepted members of their classroom group. In such a situation it is to be presumed that maladjustment would be one of the possible consequences.

*Articulatory Disorders as a Result of Maladjustment.* Speech is certainly one of the modes of behavior through which maladjustments may be expressed. One may wish to argue that articulatory deviations are just as effective as vehicles for the expression of maladjustments as are any other types of functional speech disorders. However, maladjustments, if they are to grow into full-blown behavioral disturbances, must be consistently nursed by the right kinds of rewarding experiences. For example, if functional articulatory disorders and stuttering are compared, it would appear that our culture may be more tolerant of the articulatory problems than of the stuttering. If this is true, then it may also be true that articulatory problems are actually a poorer vehicle, and therefore less frequently used, than stutterings for the expression of maladjustments. Nevertheless, the possibility that the articulatory defect *may be* an expression of the basic maladjustment of the speaker must be recognized.

Statements are to be readily found in the literature indicating or implying that articulatory defects may be the result of maladjustment. For example, West, Kennedy and Carr (*17*) maintain that good speech can be attained only after the emotional patterns are made subservient to the purely linguistic needs, and that certain sound substitutions are an indication of emotional immaturity in the adult. Van Riper (*15*) says that the desire to retain childhood security often produces symptoms of articulatory disorders.

As has already been indicated, com-

paratively little research has been done on the subject of the personality of the individual with an articulatory disorder. Some research of a general survey character has been done in which all types of speech disorders have been included in a single experimental group. However, this review has been confined to those studies which have been concerned with the relationship of personality to articulatory disorders only. This review includes every appropriate study that has been abstracted or published in *Speech Monographs* or the *Journal of Speech and Hearing Disorders*. It also includes any studies listed in the *Psychological Abstracts* which have been published since 1950. There are nine studies in all.

*Studies Indicating a Relationship Between Maladjustments and Articulatory Problems.* In 1938, Templin (*14*) gave the Moore-Gilliland Test for Aggressiveness to several groups of students at Purdue University. Her groups consisted of 49 normal speakers, 37 articulatory defectives, 15 voice defectives and 19 rhythmic defectives. She found that the average aggressiveness of the articulatory group was the lowest of the three groups of speech defectives and was significantly lower than that of the normal group. However, she concluded that the articulatory defective tended to be more aggressive as his defect is more severe. This would appear to imply that, to some degree at least, the defect, once started tends to cause, or at least aggravate, such maladjustments as may exist.

In 1946 Wood (*18*) published a study concerning the relationship of parental maladjustment and functional articulation defects. As part of his study he gave 50 children with articulatory deviations the California Test of Personality and the Pintner Aspects of Personality Test. He found in both instances that the children did not differ significantly from the test norms. On the other hand, the Thematic Apperception Test was given to approximately half of the children and only three of them 'exhibited no preponderance of unfavorable dynamisms.'

Using the Personality Scale of the American Council for Education, Kennedy (*8*), rated 27 articulatory defectives on their social adjustment according to parent and teacher opinion. Twelve of the 27 cases were rated either moderately or seriously disturbed emotionally with behavior characteristics noticeable enough to attract attention. Kennedy stated that these children 'tend to conform well enough to get by and are about equally divided as to aggressive and withdrawn types. They rarely achieve leadership in a group socially.' No control subjects were used in this study nor were the personality judgments based on any standardized, objective tests or rating scales.

In 1952 Deming (*3*) studied 20 elementary school children with functional articulatory defects and a matched control group. The children were given the Bender Visual-Motor Gestalt Test. The speech defective subjects were found to be significantly less accurate in their reproductions of the test figures than were the normal subjects. On the basis of the qualitative interpretation of the test results, Deming concluded that the speech defectives were more 'withdrawn and constricted in their social and outer world relations than were the children with normal speech.' However, he felt that no conclusions could be

drawn from his data concerning the causal relationship between speech and the maladjustments found.

Greenberg (*5*) in 1952 gave the Rosenzweig Picture-Frustration Study for Children and the Brown Personality Inventory for Children to 36 children with functional articulatory defects in grades four, five and six and their matched controls. He concluded that there was a relationship between personality and articulation errors although he felt that the nature of the relationship could not be determined. He noted tendencies on the part of the speech defective group to be more dependent upon others, to show more defensiveness, to maximize frustrating situations, to be less well-adjusted in home and school situations and to be more insecure generally.

The studies so far cited, five in all, have revealed some evidence of maladjustments among various groups of articulatory defectives.

*Studies Indicating No Relationship Between Personality Maladjustment and Articulatory Problems.* Anders (*1*) gave the California Test of Personality to 53 children ranging in age from 6 to 12 years of age who had functional articulatory defects. In comparison to the norms for the test, the subjects were above average in adjustment. She concluded that 'speech correction for functional articulatory defects cannot be justified on the basis of preventing inevitable personality maladjustment.'

In 1947 Reid (*12*) studied 'the presence of measurable developmental factors in relationship to the presence of functional articulatory defects and the effectiveness of speech reeducation.' As part of her study she administered the California Test of Personality to 38 children with functional articulation disorders ranging in grade level from grade one to grade seven. She concluded that 'improvement in articulation ability is not related to and cannot be predicted from personal and social adjustment.'

In 1948 McAllister (*9*) studied 100 articulatory defectives in the first eight grades and their matched controls. She gave them the California Test of Personality and an original speech attitude scale. She found no differences between the two groups of subjects and concluded that 'emotional instability cannot be substantiated as a causal factor in articulatory defects' and that 'the speech defect does not cause malattitudes toward speech or emotional stability.'

Nelson (*10*) studied a group of 35 children with functional articulatory defects from grades three, five and seven and their matched controls. He gave the California Test of Personality to both groups and concluded that there was 'no support for the contention that children with functional disorders of articulation were more poorly adjusted than normal speakers of comparable age.'

It is of some interest to note that the California Test of Personality was employed in five different studies. This is the only test employed by more than one experimenter and in all instances the differences between the children with defective articulation and those with normal articulation were not significant.

*Evaluation of the Studies.* With a five to four count in favor of maladjustment it would appear that no conclusive data exist on which to base any kind of a generalization, one way or the other. However, one is struck by the wide range of severity of the articulatory defects frequently found

in the groups studied. It is to be questioned whether many of the mild articulatory defects that are worked with clinically really represent serious barriers to communication. If they do not, it would be *surprising* to find that measurable maladjustments are related to this rather vaguely defined group of problems. The study is yet to be done which attempts to measure the adjustment problems of a group of speakers with *severe* articulatory problems. The multiplicity of causes is so great, the effects of the disorder are so varied, and the inherent error within the testing instruments used is so great that it would be surprising, indeed, to find conclusive data on this question from the study of the usual 'representative' sample of individuals with articulatory problems.

One must also reckon with the possibility that the adjustment problems of this group of speakers may be highly specific to their speech. Perhaps the frustrations of faulty communication have not become generalized maladjustments. If so, testing instruments designed to measure general maladjustments and anxiety states can hardly be expected to identify the differences between these speakers and normal speakers.

Finally, a word of comment on the test measures which have been employed. 'Personality' is certainly a vague word. In fact, Wepman (*16*), speaking about the role that personality may play in recovery from aphasia says, 'Too many psychologists hold such widely diverging opinions for any such generic term as "personality" to be meaningful . . .' When studies of the sort just reviewed are done, are the investigators interested in adjustment, psychiatric manifestations of behavior, ascendancy-submission, happiness or some other of any number of aspects of behavior?

It would appear that the choice of a testing instrument in such studies is a crucial question. It would seem mandatory that the researcher have some empirical evidence or *a priori* theoretical basis for supposing that individuals with articulatory defects are different in some respects from children with normal articulation. He should then select a test which does the best job of measuring what he wants to measure. There is no indication that such selection procedures have been generally used in the studies just reviewed. Most of the measures which have been used are non-empirically derived measures that are unreliable and lacking in validation. Ellis (*4*) has been particularly devastating in his criticism of the validity of the group-administered personality questionnaires.

In summary, one is forced to conclude that the contribution of research to an understanding of the relationship between articulatory defects and personality is largely negative. The data do not justify a statement about the relationships. Thought must be given to the theoretical issues involved, the questions to be asked, and the measures to be employed to answer those questions. Clearly, these things have not been acceptably done yet. And the effort is long overdue.

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# Consistency Of Stuttering In Relation To The Goal Gradient Hypothesis

Harold L. Luper

In previous studies, the types of behaviors exhibited during different blocks and the contextual loci of stuttering blocks have been shown to have some consistency. Johnson and Innes (*6*) found that approximately two-thirds of the words stuttered in a given reading of a passage were stuttered again in succeeding readings of the same passage. This tendency to stutter on the same words was labeled the 'consistency effect'. Barr (*1*) found that most of her subjects tended to use the same phenomena on at least 60 per cent of their blocks. Recently, Trotter (*9*) has shown that the more severely stuttered words are those that are stuttered most often in successive readings of the same material.

Clinical observations would indicate that this consistency is not merely an artifact of the experimental conditions. For example, in discussing the treatment of stuttering, Van Riper (*10*) states:

> So exact and similar are many of the stutterer's blockings that occasional breathing records of one stuttering act can be placed over those of another such act with excellent matching. Much variation in terms of duration may occur; many stutterers may have several 'spasm patterns' which they try out in turn when very afraid; but most secondary stutterers have characteristic stuttering patterns as distinctive as their fingerprints.

The recent attempts to explain stuttering in terms of a drive reduction learning theory by Sheehan (*7*, *8*), Van Riper (*10*), and Wischner (*11*, *12*) are pertinent to an explanation of this consistency. According to these writers, the act of stuttering is accompanied by a feeling of 'dread' or 'anxiety', and the completion of the stuttering block (or the removal of the feared word) leads to a feeling of 'relief' or 'anxiety reduction'. This anxiety reduction then serves to reinforce any contiguous behaviors and to give rise to the stutterer's typical symptoms; conversely, behaviors that do not occur in close temporal contiguity with anxiety reduction are not reinforced and the tendency for these behaviors to recur in future stuttering acts is decreased.

If the assumption is held that the completion of the stuttering act reinforces the contiguous behaviors, then it would also be expected that the specific, individual behaviors within the stuttering act are *differentially* reinforced according to their *relative* nearness to the completion of the stuttered word. In other words, this would appear to be a case of Hull's

Harold L. Luper (Ph.D., Ohio State University, 1954) is Assistant Professor of Speech Correction, The University of Georgia. This article is based on a portion of a doctoral dissertation completed at Ohio State University under the direction of Professors Delos D. Wickens and John W. Black, and is an adaptation of a paper presented at the 1954 Convention of the American Speech and Hearing Association in St. Louis, Missouri.

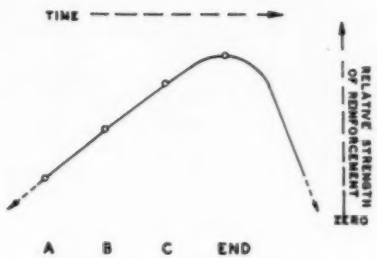


FIGURE 1. Graphic representation of the relative strength of reinforcement of behaviors occurring at different temporal degrees of remoteness from the completion of the stuttering act, also assumed to be the point of anxiety reduction.

principle of the *goal gradient* or the *gradient of reinforcement* (*4, 5*).

The application of the goal gradient hypothesis to stuttering behavior might be presented graphically as in Figure 1, where 'a', 'b', and 'c' represent the occurrence of different specific behaviors during stuttering, such as an eyeblink, a downward head movement, and a jaw tremor, and 'end' represents the end of the stuttering block. The height on the curve represents the relative strength of reinforcement. If the same stuttered word were repeated several times during an adaptation process and if the three specific behaviors ('a', 'b', and 'c') had equal response tendencies the first time the word was spoken, it would be expected, on the basis of the anxiety reduction and the goal gradient hypotheses, that behavior 'a' would be eliminated first as the subject adapted to fluent speech, and behavior 'b' would be extinguished thereafter. Behavior 'c' should be the last symptom to disappear since it is nearest in time to the anxiety reduction (the end of the block) and would be the behavior most strongly reinforced.

The purpose of the present study was to find an answer to the question: Do stuttering behaviors which occur last in a sequence of stuttering behaviors tend to be relatively more consistent[1] during an adaptation process than behaviors which occur earlier in sequential order?

## Procedure

The experimental plan included the following steps: (a) simultaneous motion pictures and sound recordings were made of 33 stutterers as they spoke short phrases under instructions to repeat any phrase upon which stuttering occurred and to continue saying the phrase until it was spoken without stuttering; (b) the recorded samples were descriptively analyzed for the presence, sequential order, and consistency of stuttering behaviors by 22 graduate students majoring in speech science; and (c) the judges' responses were treated statistically in the testing of the hypothesis.

*Recording Procedures.* A Bell and Howell 16 millimeter motion picture camera (Model *Filmo* 70-DA) was mounted on a tripod approximately five and one-half feet in front of the subject. The distance between the camera and subject was arranged to take pictures of the subject's head and neck. Shutter speed was set at 16 frames per second. An Altec-Lansing condenser microphone (Model 21-B) remained in a fixed position approxi-

[1]The term, *consistency*, as used in this study is defined operationally as the number of times a behavior is judged to reappear in successive repetitions of the same word. When two or more behaviors are compared, the term *relative consistency* is used to denote which behavior in the stuttering act reappears through more repetitions of the same word.

mately six inches from the speaker's mouth and fed an Ampex tape recorder (Model 300-C).

Thirty-three persons, ranging in age from 18 to 35 years and all judged as 'stutterers' both by themselves and by speech clinicians, served as subjects. All experimental subjects were given typewritten instructions explaining the general procedures and a set of fifty 3 X 5 cards. Each card contained one printed phrase, such as, 'Shut up and come here' or 'Feelings are easily hurt'.[2] The subjects were told to look directly at the camera and to say the phrase upon a signal from the experimenter. The camera and tape recorder were started with the signal, 'read', and stopped after a phrase was read fluently.

*Judging Procedures.* Three different types of judgments were employed in this study. The first step was to determine the items to be used in the subsequent analyses. The experimenter and a graduate student viewed and then heard all of the recorded samples of the *first sayings* by each stutterer. *Verbal descriptions* were made of the stuttering behavior observed. For example, in viewing a film of a subject saying the phrase, 'Shut up and come here', the judges may have observed a stuttering act on the word *here*. This word would then be underlined and each judge would write descriptions such as, 'closed eyes' or 'moved head downward'. Each of the judges made independent descriptions after observing the samples no less than two times. The two sets of behavioral descriptions were then compared and only those behaviors described by both judges were used in the two subsequent steps.

After this preliminary step for selecting criterion items, two groups of judges (five in each group) determined the *sequential order* of the specific behaviors within each stuttering act. All of the recorded and filmed *first sayings* which were judged to contain at least two different behaviors in a stuttering act were rearranged in random order on film and tape. The tape recordings were presented with an Ekotape sound recorder (Model 205) to one group of judges, while the films were shown to the other group on a Bell and Howell motion picture projector (Model *Filmo-sound* No. 179) at 16 frames per second. The judges were instructed to look at the behavioral descriptions provided for each phrase and then indicate the order of appearance of the specific behaviors within each stuttering act as they watched or heard the phrase spoken. Thus, if a subject used two specific behaviors on a stuttered word, such as a pause and increased loudness, the judges were to decide which happened first.

The final judgment involved two more groups of judges (five in each group). All of the acoustical and visual recordings of the *repeated sayings* (the second and any subsequent attempts) were presented in nonsequential order. The conditions and procedures for judging were similar to those used in determining sequential order, except that the judges were asked to decide whether the described items were present or absent. From these judgments, it was possible to determine the *consistency* of the specific behaviors. In tabulating the results from judgments of repeated sayings, a behavior was compared with behaviors which had been judged

[2]The phrases used were designed to elicit stuttering. Most were selected because they contained 'emotionally loaded' words.

TABLE 1. Per cent agreement between pairs of judges in judgments of sequential order and consistency of stuttering behavior.

| *Judges* | *Sequential Order* | | *Consistency* | |
|---|---|---|---|---|
| | *Visual* | *Acoustical* | *Visual* | *Acoustical* |
| J1–J2 | 56 | 76 | 72 | 77 |
| J1–J3 | 66 | 71 | 73 | 77 |
| J1–J4 | 60 | 80 | 75 | 77 |
| J1–J5 | 65 | 82 | 71 | 77 |
| J2–J3 | 71 | 88 | 73 | 80 |
| J2–J4 | 62 | 91 | 77 | 81 |
| J2–J5 | 53 | 85 | 69 | 77 |
| J3–J4 | 68 | 91 | 77 | 82 |
| J3–J5 | 62 | 88 | 72 | 81 |
| J4–J5 | 62 | 94 | 73 | 77 |
| Median | 62 | 86.5 | 73 | 77 |

present on all previous trials. If on the particular retrial under consideration, one behavior was still judged present by two or more judges while the other behaviors were judged to be present less than twice, it was said to be more consistent. If the behaviors within a stuttering act were all judged to have the same consistency, the word was not used in the statistical test of the hypothesis.

## Results

A total of 1618 recorded phrases was obtained from the subjects; 858 were visual recordings while 760 were acoustical recordings.[3] In terms of speaking trials, 918 of the samples were recordings of the first attempts and 700 were of 'repeated sayings'. Stuttering was judged to be present on 133 of the visual samples, but on only 77 of the acoustical samples.[4]

The reliability of the sequential order judgments and of the consistency judgments was estimated by computing the per cent agreement between pairs of judges by a formula suggested by Festinger (*2*):

$$\frac{\text{Sum of Agreements} \times 100}{\text{Sum of Agreements} + \text{Sum of Disagreements}}$$

The per cent agreements between any two judges are presented in Table 1. The median per cent agreement between pairs of judges in the sequential order judgments of acoustical samples was 86.5; for the visual sequential order judgments, the median per cent agreement was 62. In the consistency judgments, the median per cent agreements found were 77 for acoustical samples and 73 for visual samples. In general, the agreements did not run as high as might be desired for the testing of the hypothesis.

This study was concerned chiefly with finding whether or not stuttering behaviors which occur last in a

[3]Some samples were lost from both the motion pictures and the sound recordings due to technical failures.

[4]It is interesting to note that a larger number of behaviors were described as 'stuttering' when presented visually than when the same stuttering acts were presented acoustically. This fact is given more attention in another paper now in preparation.

sequence of stuttering behaviors tend to be retained longer during an adaptation process than behaviors which occur earlier in the sequential order on the first attempt to say the word. Stated in null form, the hypothesis under test was: *In successive repetitions of the same word, the relative consistency of stuttering behaviors of different original sequential order does not depart systematically from equal probability*. A chi-square formula with Yates' correction for continuity was employed:

$$X^2 = \text{SUM}\ \frac{(f_o - f_e/-1)^2}{f_e}$$

where $f_o$ = the observed frequency and $f_e$ = the expected or theoretical frequency, in this case equal probability. The hypothesis was tested separately for each of four groups of data: (1) acoustical samples of words having only two behaviors; (2) visual samples of words having only two behaviors; (3) acoustical samples of words having three or more behaviors; and (4) visual samples of words having three or more behaviors.

*Words having only two behaviors—acoustical samples.* There were 40 words from the acoustical data which were judged to have only two stuttering behaviors on the first saying and in which one behavior reappeared through more repetitions of the word than the other behavior. Of these 40, the earlier occurring behavior was more consistent on 25 words, while the later occurring behavior was more consistent on 15 words. ($X^2$ = 2.03; 1 d.f.; not significant at the .05 level of confidence.)

*Words having only two behaviors—visual samples.* From this group of data, there were 38 words in which there was a difference in consistency between the two behaviors. The earlier occurring behavior was more consistent on 23 words, while the later occurring behavior was more consistent on 15 words. ($X^2$ = 1.28; 1 d.f.; not significant at the .05 level of confidence.)

*Words having three or more behaviors—acoustical samples.* For words having more than three behaviors, the categories were reduced to three by considering only the relative consistency of the last three behaviors and adding these figures to the frequencies found for words having only three behaviors. There were six words in the acoustical samples which had three or more behaviors and in which one behavior was relatively more consistent than the others. Of these six, the behavior of earliest sequential order was the most consistent on three words, the next-to-last behavior was most consistent on three words, while there was no word on which the last occurring behavior was most consistent. Because of the small theoretical frequencies, the chi-square test of equal probability was not used.

*Words having three or more behaviors—visual samples.* There were 29 words in the visual samples in which one behavior was more consistent than the others. The earliest occurring behavior was the most consistent on 10 words, the next-to-last behavior was most consistent on 12 words, while the last behavior was most consistent on 7 words. ($X^2$ = .85; 2 d.f.; not significant at the .05 level of confidence.)

In summary, none of the distributions yielded significant chi-squares at the .05 level of confidence. Since the hypothesis was not rejected, the relative consistency of stuttering behaviors of different original sequential order would appear to be largely a matter of chance.

## Discussion

The data collected in this study seem to indicate that the relative closeness of a specific behavior to the completion of a stuttering block has little effect upon the number of times the specific behavior is repeated in successive blocks on the same word. There was, however, a non-significant trend for the earlier occurring behaviors to be more consistent. These results do not agree with the prediction that would be made if the completion of the stuttering act served to reinforce the prior behaviors differentially according to the concept of a gradient of reinforcement, and if the various behaviors had equal response tendencies at the beginning of the experimental series. Subsequent inquiries, concerned with a relationship between anxiety reduction and the patterns of stuttering behavior, might investigate the possibilities that:

1. The specific behaviors in 'real blocks', such as used in this study, may not have equal response tendencies on the first attempts to say the words. It seems likely that a person anticipating a stuttering act might first use a behavior which in the past had been most successful in ending or escaping the actual stuttering block. These first behaviors, therefore, may have stronger response tendencies than the later behaviors and consequently would be more consistent in an adaptation process.

2. The relative consistency of the specific behaviors included within the stuttering act perhaps is not determined by their proximity to the point of reinforcement, even though the total stuttering pattern may be reinforced by anxiety reduction. In other words, the specific behaviors, such as eye blinks or lip tremors, might be the result of a disintegration or disorganization of behavior such as hypothesized by Hill (*3*) and might not in themselves be learned phenomena.

3. The point of reinforcement, even though it may still be the result of anxiety reduction, might not be the completion of the stuttering act. Perhaps the anxiety is reduced as soon as the stutterer makes a direct attempt on a feared word or as soon as he begins to stutter. This possibility has been discussed in detail by Sheehan (7).

4. Finally, it is possible that stuttering behavior is not reinforced by anxiety reduction at all. Throughout this paper, for purposes of experimentally testing the hypothesis, it has been assumed that anxiety reduction is a reinforcing agent in stuttering behavior. The results of this study do not support that assumption.

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# Stuttering Behavior And Anxiety As A Function Of Experimental Training

Albert E. Goss

The concept of anxiety has proved useful for the integration of numerous observations of antecedents and correlates of stuttering behavior (*8, 9, 10*). Of relevance here is a study of the relationship between stuttering frequency and word-exposure time performed by Goss (*2*), in which stutterers were instructed to say words which appeared one at a time in the exposure slot of a memory drum. The 96 words of the first experiment were selected to assure relatively high frequencies of stuttering. As each word was exposed, a light signal to speak occurred at the same time (0 seconds between word and signal) or 1, 2, or 5 seconds later. The 24 words for each of these intervals were presented in random order and, for the entire group of subjects, each word was combined with each interval an equal number of times. For the second experiment, the list was shortened to 72 words and six sets of 12 words were presented at intervals of 0, 1, 2, 4, 7, and 10 seconds. The 72 words were administered to each subject three times.

Under these conditions, frequency of stuttering was observed to decrease for words exposed from 0 to 1 or 2 seconds before the signal to speak and then to increase for words exposed up to 10 seconds. Two sources of anxiety were hypothesized to explain this downward-upward trend in stuttering. One source was identified as anxiety stemming from anticipation of word exposure. Anxiety from this source was presumed to increase to a maximum at about the same time the word-cues were presented and then to decrease, thus occasioning the initial decrease in stuttering after word exposure. Duration of exposure of the word-cues appeared to be a second source of anxiety. It was assumed that an increase in this source of anxiety reversed the decrease in anxiety about word exposure and brought about the subsequent upward trend in frequency of stuttering.

The first of the hypothesized sources of anxiety, the source which was presumed to increase until the word was exposed and then to decrease, was suggested by experimental findings and related theorizing of Mowrer (*5*), Brown (*1*), and Rosenbaum (*6*). Each of these investigators presented a stimulus at some regular time interval; for example, a light signal for keypressing or electric shock which elicited a jumping response in the rat occurred every 12 seconds. After reaction times or jumping magnitudes had reached stable values, the eliciting signal or shock

Albert E. Goss (Ph.D., State University of Iowa, 1948) is Associate Professor of Psychology, University of Massachusetts. This article is based on a Ph.D. dissertation completed at the State University of Iowa under the direction of Professor I. E. Farber.

was introduced at a number of test intervals which were both shorter and longer than the 12-second training interval. In general, strengths of the responses elicited by the signal or shock stimuli declined progressively as test intervals were increasingly shorter or longer than the training interval. The general form of response decrements on both sides of the training interval was described as a bidirectional downward gradient about the training interval.

In Goss' experiments, time intervals between cessation of saying one word and exposure of the next were relatively constant. Thus, although conditions were not exactly congruent with those of the other experiments, it seemed probable that the anxiety about word occurrence might soon have developed at the point in time where words usually occurred; the anxiety would be less for intervals both shorter and longer than the average interval between response cessation and word exposure. The postulated decline in anxiety for the longer intervals was, of course, the presumed basis of the decrease in stuttering from 0 to 1 or 2 seconds.

The present study was designed to provide a test of this hypothesis of a bidirectional gradient of anxiety about the point in time at which words to be spoken appeared, a test which would not involve the complication of possible effects of the time intervals between word occurrence and signal to speak. Actually, of course, frequency of stuttering at the uniform training interval and for shorter and longer intervals was the observed dependent variable. The course of anxiety would then be inferred on the basis of a one-to-one relationship between frequency of stuttering and strength of anxiety.

If three concepts and principles of general behavior theory are extended to stuttering behavior (*8*), explanation of the hypothesized increase and decrease in anxiety is possible. The first assumption is that, because frequent social punishment has probably followed saying many of the words in the stimulus list, those words have been conditioned to an anxiety response. This anxiety response is conceived as autonomically-mediated visceral reaction with perhaps central or centrally-mediated correlates (*2*). Because the words elicit anxiety in a regular fashion, they can be considered unconditioned stimuli for further conditioning; presentation of the words at a uniform interval is considered analogous to occurrence of signal or shock.

The second assumption concerns the nature of stimuli to be conditioned to the anxiety response elicited by word-stimuli. These to-be-conditioned stimuli are presumed to be stimuli produced by subjects' responses of waiting-for-the-word. Most likely such stimuli will be produced by implicit verbalizations and/or postural and receptor adjustments.

The third assumption is that patterns of response-produced stimuli change from instant to instant but in a sequence which is relatively uniform from trial to trial. Therefore, essentially the same specific pattern of such stimuli should be present on each trial when word-cues elicit anxiety but this pattern will be somewhat dissimilar to patterns for both shorter and longer time intervals. Because greatest associative strength should be between the anxiety response and the stimulus pattern most immediately contiguous with the anxiety response and its reduction in strength, the strength of anxiety should decline for increasingly

shorter or longer intervals; that is, a bidirectional gradient of anxiety should occur. Moreover, the further assumption of a direct relationship between anxiety and frequency of stuttering leads to the prediction that training at a constant interval should produce a congruent bidirectional gradient of stuttering.

In order to maximize trial-to-trial stability and uniformity of stimuli produced by the hypothesized responses of waiting-for-the-word, a light warning signal was flashed seven seconds after cessation of each response. Both training and test intervals were measured between cessation of this light and word exposure. Thus, a more precise specification of the experimental problem would be that training at a constant time interval between cessation of a warning signal and exposure of words-to-be-spoken should result in a bidirectional downward decrement in stuttering frequency for time intervals increasingly distant from the training interval. As noted above, the course of anxiety would be inferred from stuttering frequency.

Three considerations – for which present knowledge permitted no precise allowance–qualified this prediction. First, unless a large proportion of the words of the training list aroused anxiety, training at the constant interval might not establish associations between waiting-response-produced-stimuli and anxiety. Furthermore, even with constantly changing word-cues, adaptation of stuttering and, inferentially, a correlated decrement in anxiety strength (*3*, 7, *8*) might be sufficient to prevent development of strong associations or to obscure any bidirectional gradient about the training interval. Finally, clinical protocol suggested that, prior to any training at a specific interval, stuttering frequency might increase as a function of the length of the waiting interval. Therefore, to allow for this pretraining relationship, the experimental design involved three steps: (1) a pre-training test of stuttering as a function of the time intervals to be employed after training to establish a baseline against which post-training behavior could be compared; (2) a training series with a constant time interval between warning signal and exposure of the word-to-be-spoken; and (3) a post-training test of the hypothesized bidirectional gradient of stuttering behavior about the training interval.

## Method

*Subjects.* Thirty-seven male and three female stutterers from 16 to 30 years of age with a median of approximately 22 years participated in the pre-training session. All had been or were currently enrolled for clinical treatment of stuttering in the Psychological and Speech Clinic of the State University of Iowa. Due to illness, refusal to continue to participate, and departure from the University, only 22 of the 37 male stutterers, along with the three female stutterers, continued through the training and post-training sessions. This group contained a slightly larger proportion of severe stutterers than the larger group but there were no appreciable differences in age and extent of clinical experience.

*Word stimuli.* In order to obtain a high frequency of stuttering, the 250 nouns, adjectives, verbs, and adverbs, except those beginning with 'Z,' were nine or more letters and three or more syllables in length. Proportionately

TABLE 1. Percentages, means, and standard deviations of words stuttered at each time interval by 25 and 40 pre-training subjects.

| *Time Interval in Seconds* | *25 Subjects* | | | *40 Subjects* | | |
|---|---|---|---|---|---|---|
| | *Percentage* | *Mean* | *SD* | *Percentage* | *Mean* | *SD* |
| 4 | 60.0 | 1.20 | 0.85 | 52.5 | 1.05 | 1.32 |
| 8 | 68.0 | 1.36 | 1.30 | 65.0 | 1.30 | 0.78 |
| 12 | 66.0 | 1.32 | 0.72 | 61.2 | 1.22 | 0.79 |
| 16 | 74.0 | 1.46 | 0.70 | 70.0 | 1.40 | 0.73 |
| 20 | 80.0 | 1.60 | 0.57 | 72.5 | 1.45 | 0.63 |

more words beginning with sounds on which stuttering occurs most frequently were included. Assignment to one list of 10 and three lists of 80 words each was random within restrictions that: (a) each list would contain equal proportions of the most difficult initial sounds and (b) words beginning with the same sound would be separated by at least nine other initial sounds. The words of each list were then typed on separate tapes in large type with each letter capitalized.

*Word-exposure and timing.* Words were exposed by raising the shutter of the window of a Hull memory drum. The timing of the appearance of successive words was controlled by mechanical and electronic timing devices which were activated by a switch controlled by the experimenter. To present each word, the switch was pressed to start the drum. After seven seconds, a cam attached to the driveshaft of the drum turned on a red light signal for one second. Breaking the light circuit coincided with stopping the drum and activated an electronic timer which could be set for time intervals of 4, 8, 12, 16, or 20 seconds. After one of these intervals had elapsed, the shutter of the drum was raised and the word-to-be-spoken exposed. A standard electric timer started at the same time. As soon as the subject said the word, the experimenter pressed the switch which dropped the shutter, stopped the timer, and started the drum to begin a new cycle.

*General stimulus conditions.* In order to reduce and standardize external stimulation, the experimenter and the apparatus were located behind a one-way vision screen in a room which was dark except for a 60-watt bulb suspended above and slightly in front of the subject who was seated in front of the screen. Various parts of the apparatus were partially sound-insulated and the experimental room was relatively isolated and quiet.

*Procedure for pre-training series.* On the pre-training day, the words of the 10 word list were presented after intervals of 4, 8, 12, 16, or 20 seconds between light cessation and word ex-

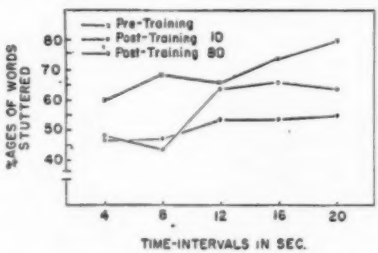


FIGURE 1. Percentages of words stuttered at each time-interval during pre-training and during the first 10 and all 80 post-training words.

posure. There were two words at each interval and all intervals were used in the first five and the second five trails. Because word-order was constant for all subjects, five different random assignments of intervals were presented so that every interval was used for each word. These five combinations of intervals and words were equally distributed among the 40 subjects of the pre-training session and nearly so among the 25.

*Procedure for training series.* Effects of pre-training were minimized by periods of at least a week between the pre-training and training series. The training interval was 12 seconds between light cessation and word exposure. Two different lists of 80 words each were presented on successive days with the same order of lists and of words within lists for all of the 25 subjects.

*Procedure for post-training series.* On the third day, the 80 words of the third list were presented after intervals of 4, 8, 12, 16, and 20 seconds. All intervals were used in each of 16 blocks of five words each. The word order was constant but because every interval was used with each word there were five random orders of intervals. Each order was used with five subjects.

*Observation and recording of stuttering.* Frequency of stuttering was determined by the experimenter's judgment of whether or not stuttering occurred. Judgment reliability was 93% agreement with another judge in the same situation and 95% agreement with stutterer's self-judgments in a similar situation (*2*). Time between word exposure and response cessation was also obtained for exploratory purposes. Because of marked intra- and inter- individual variations in this measure, however, the results could not be readily interpreted, and hence will not be described.

## Results

*Pre-training series.* For comparison with post-training trends, percentages of words on which stuttering occurred at each time interval for the 25 subjects who participated through the remaining series were computed (Table 1) and plotted as the solid line curve of Figure 1. Percentages for the 40 subjects and means and standard deviations of words stuttered by both 40 and 25 subjects have also been summarized in Table 1. Although the 25 subjects stuttered more frequently at all intervals than the 40, the upward trends from four to 20 seconds were

TABLE 2. Analyses of variance for testing differences among intervals with respect to mean frequency of stuttering for the pre-training test.

| *Source* | *25 Subjects* | | | *40 Subjects* | | |
|---|---|---|---|---|---|---|
| | *df* | *Mean Square* | *F* | *df* | *Mean Square* | *F* |
| Intervals | 4 | 0.588 | 2.87* | 4 | 0.995 | 4.16† |
| Subjects | 24 | 1.991 | | 39 | 349.126 | |
| Intervals x Subjects | 96 | 0.205 | | 156 | 0.239 | |

*Significant at the .05 level with 4, 96 *df*
†Significant at < .01 level with 4, 156 *df*.

TABLE 3. Percentages, means, and standard deviations of words stuttered at each time interval for the first 10 and all 80 post-training words.

| *Time Interval in Seconds* | *First 10 Words* | | | *All 80 Words* | | |
|---|---|---|---|---|---|---|
| | *Percentage* | *Mean* | *SD* | *Percentage* | *Mean* | *SD* |
| 4 | 48.0 | 0.96 | 0.92 | 46.7 | 7.48 | 5.28 |
| 8 | 44.0 | 0.88 | 0.87 | 47.0 | 7.52 | 5.72 |
| 12 | 64.0 | 1.28 | 0.77 | 53.7 | 8.60 | 5.25 |
| 16 | 66.0 | 1.32 | 0.24 | 53.7 | 8.60 | 5.27 |
| 20 | 64.0 | 1.28 | 0.53 | 55.5 | 8.88 | 5.37 |

strikingly parallel. *F*'s of 2.87 ($p=.05$) for 25 subjects and 4.16 ($p < .01$) for 40 subjects (Table 2) for differences among the means coupled with *t*'s of 2.18 to 3.66 ($p = .03$ to $< .01$ with 156 and 96 *df*) for differences between the means of the 4 and both the 16- and 20-second intervals indicated that the increase in frequency of stuttering with longer time intervals could not be attributed to chance.[1] The slight downward dip at the 12-second interval was not statistically significant.

*Training.* During the training series, the 25 subjects stuttered on 54.2% of the 80 words of the first list, 51.8% of the 80 words of the second list, and on 53% of the entire 160 words. The percentages of words stuttered for the first 10 words of the first and second lists were 65.6 and 56.0 respectively. This difference would suggest that some intra-series adaptation had occurred (*3*, 7, *8*). Since subjects stuttered on more than half of the training words, it is likely that sufficient opportunity was provided for conditioning the anxiety response to hypothesized waiting-response-produced stimuli.

*Post-training series.* Percentages, means, and standard deviations of words stuttered at each time interval were computed for the first 10 and all 80 words of the post-training list (Table 3, Figure 1). While the 10 words were comparable to pre-training experiences in length and, probably, approximate extent of adaptation within experimental sessions, it is likely that the measures based on the entire list are more reliable. Differences among means of the intervals yielded *F*'s of 5.23 ($p < .01$) for the 10 words and 4.13 ($p < .01$) for the 80 words (Table 4). The *t*'s for differences between the means of the 4- and 8-sec. intervals and those for 12, 16, and 20-sec. intervals ranged from 2.49 to 3.42 for the 10 words ($p = .02$ to $< .01$ with 96 *df*) and from 2.34 to 3.04 for the 80 words ($p = .02$ to $< .01$ with 96 *df*) to indicate significantly more stuttering at the longer intervals.

There were decrements in percentages of words stuttered at each time interval between pre- and post-training and between the 10- and 80-word post-training lists at the 12-, 16-, and 20-second intervals. While these decrements might be due to differences in word composition of the lists, it is more likely that they exemplify the well established phenomena of inter-session and intra-session adaptation (*3*, 7, *8*). The critical question with respect to the experimental hypothesis,

[1]These and subsequent *t*'s for differences between pairs of means of intervals were based on interaction variances (intervals x subjects).

TABLE 4. Analyses of variance for testing differences among intervals with respect to mean frequency of stuttering for the post-training tests.

| Source | *First 10 words* | | | *All 80 words* | | |
|---|---|---|---|---|---|---|
| | *df* | *Mean Square* | *F* | *df* | *Mean Square* | *F* |
| Intervals | 4 | 1.072 | 5.23* | 4 | 11.012 | 4.13* |
| Subjects | 24 | 2.642 | | 24 | 140.132 | |
| Intervals x Subjects | 96 | 0.205 | | 96 | 2.666 | |

*Significant at $<$ .01 level with 4, 96 *df*.

however, was not the occurrence of overall decrements, but rather, whether the decrements would be progressively greater about the 12-second training interval. Both of the post-training curves indicate that stuttering decreased least at the 12-second interval. While the decreases at four seconds were less than those at eight seconds, the decrements at the 20-second interval were greater than at 16 seconds.

Lindquist's Case 12 (*4*) was applied to test the significance of the apparent differences in pre- and post-training trends.[2] The *F* of 1.99 for the comparison with the 10-word post-training list was not significant but a *t* of 2.13 ($p = .05$, $df = 24$) indicated that the decrement at 12 seconds was significantly less than the average of the decrements at the other four intervals.[3] The *F* of 2.77 ($p = .05$) with respect to the 80-word post-training list indicated a significant difference in these two trends. Thus the weight of the statistical analysis supports the conclusion of a post-training change in trend due to the relatively greater decrements at the intervals about the 12-second training interval. Only at the longer intervals, however, was there some indication of a progressive increase in decrements.

## Discussion

*Pre-training.* Frequency of stuttering increased from four to 20 seconds between light cessation and exposure of the word-to-be-spoken prior to any training at the 12-second interval. The approximately linear trend suggests that the asymptote or maximum for this relationship is probably at some point beyond 20 seconds.

By inference, a parallel trend existed between anxiety and the time intervals. This provides some support for the notion of an increase in anxiety in anticipation of presentation of word-

[2]The complete analysis of variance has not been summarized because only one of six ratios is pertinent to the experimental hypothesis. This ratio, which tests the hypothesis of no differences among the differences between pre- and post-training curves at successive intervals, is the interaction of pre- and post-training with the time intervals over the triple interaction of pre- and post-training, time intervals, and subjects. For the pre-training and the 10 post-training words, the numerator and denominator mean squares were 0.344 and 0.173 respectively. A numerator mean square of 3.975 and a denominator mean square of 1.436 yielded the *F* of 2.77 for the comparison with the trend for 80 words. Both *F*'s were based on 4 and 96 *df* with 2.47 specifying the .05 level of significance.

[3]The mean of the decrements at the 12-second interval was 0.04 against an average decrement of 0.30 at the other intervals with an error variance of 0.0149.

cues. Additional evidence for such an anxiety process comes from stutterer's drawings (indicating tension, anticipation, etc.) before and during moment of stuttering (*9*).

*Post-training.* The post-training curves for percentages of words stuttered for 10 and 80 words overlapped at the four- and eight-seconds intervals but the curve for 80 words was somewhat lower at the longer intervals. The overall effect was of an initial flat segment comprising the four- and eight-second intervals followed by a rise at the 12-second point with a second section of approximately zero-slope beyond that point. Although the hypothesis of no difference in the overall trends for the pre-training and post-training curve for 10 words could not be rejected, the greater average decrement at the 4, 8, 16, and 20-second intervals plus the significantly different trend for 80 words suggest that training at 12 seconds might have changed the pre-training relationship between frequency of stuttering and length of time interval for intervals both shorter and longer than 12 seconds. However, the progressive decrements beyond 12 seconds did not hold for the shorter intervals, providing only partial confirmation of the details of the hypothesized bidirectional downward change.

Extinction of anxiety responses to general features of what was for the subjects a relatively strange situation might have accounted for the overall decrement in frequency of stuttering between the pre- and post-training series. The bidirectional modification could then represent additional differential extinction of anxiety responses to waiting-response-produced stimuli for intervals both shorter and longer than 12 seconds. Or, specific and intensive training at 12 seconds might have conditioned anxiety to additional waiting-response-produced stimuli at 12 seconds to offset extinction of anxiety responses to features of the general situation. In this case, the bidirectional change would be attributed to decreasing similarity of stimuli for shorter and longer intervals.

Observations of stuttering adaptation (*3*, 7, *8*) would have led to the expectation of the largest decrement at the 12-second interval. The fact that the contrary was the case argues for the operation of a counterbalancing factor, presumably, the conditioning of additional stimuli to the anxiety response. Although the latter alternative is favored, it is possible that both differential extinction and generalization of conditioning underlie the apparent change in trend. Neither explanation alone or in combination, however, provides an adequate account of the failure to obtain a progressively greater decrement from 8 to 4 seconds. Speculatively, the words *per se* may have been sufficiently difficult to establish a minimum level of stuttering which might have been reached at the shorter intervals to prevent any progressive change.

## Summary

Theoretical analysis of the role of anxiety in stuttering was combined with principles of temporal conditioning to predict that training at a constant interval between light cessation and exposure of word-cues would occasion a bidirectional downward change in stuttering frequency about the training interval.

Forty adolescent and adult stutterers served in a pre-training series and 25 of these continued through the remaining sessions. The stimulus

words were selected to elicit high frequencies of stuttering. They were presented in an apparatus automatically controlling a cycle of events which included 4, 8, 12, 16, or 20-second intervals between light cessation and word exposure. Two of the 10 words of the pre-training list were exposed at each of the 4, 8, 12, 16, and 20-second intervals. Stuttering frequency appeared to increase linearly as a function of length of interval.

The training interval was 12 seconds between light cessation and word exposure. Stuttering occurred on 53% of the words of two training lists of 80 words each. Percentages of words stuttered at each interval decreased from pre- to post-training presumably because of overall adaptation effects. The decrements, however, were greater at the 4 and 8, and 16 and 20-second points than at the training interval. Differential extinction of anxiety at the shorter and longer intervals and/or conditioning of additional waiting-response-produced stimuli to anxiety at the 12-second interval were considered possible explanations of the bidirectional changes about 12 seconds. In addition, a minimum level of stuttering was postulated to explain the failure to obtain increasing decrements from eight to four seconds.

## Acknowledgments

The author is indebted to Professors Wendell Johnson, Kenneth W. Spence, and George J. Wischner, and particularly to Professor I. E. Farber for their aid and criticism. Refinements in apparatus were in large measure due to Professor J. S. Brown.

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# Socio-Psychotherapeutic Approach To The Treatment Of Aphasic Patients

Manuel Aronson

Leo Shatin

Jeanne C. Cook

This is a report of a group socialization and psychotherapeutic program conducted for male aphasic patients during the past twelve months at the Albany Veterans Hospital. The program was conducted under the joint auspices of Clinical Psychology (Psychiatry and Neurology Service) and Educational Therapy (Physical Medicine and Rehabilitation Service). The mechanics of speech re-training were deemphasized in this group program, for the patients were already receiving individual speech instruction. The primary orientation was toward the patients as a group experiencing emotional difficulties in adjusting to their environment—emotional difficulties associated with the presence of a severe speech disorder.

This report describes fully the group program as developed and implemented at a general medical and surgical hospital. It has a three-fold purpose: (1) To describe the procedures employed in sufficient detail to permit their consideration for use by other workers in appropriate settings; (2) to evaluate such a program as it appears to patient participants and professional hospital staff; and (3) to indicate the function and applicability of such a program in a general hospital which is not a special speech center and which is not *uniquely* equipped to undertake the re-training of aphasics.

The term aphasia was defined as a defect in the power to communicate expressively through speech, writing, or other symbols, or to comprehend spoken or written language, due to injury or disease of the brain.

Although the program at Albany Veterans Hospital was conceived as a group psychotherapeutic program which in addition offered the patients an increased opportunity for socialization and communication, it soon became apparent that this medium also provided a closer liaison with the patient's physician and with ward personnel. The integration of the several treatment modalities generated an holistic approach to the patient.

Group re-education procedures in dysphasia are not new, but the group

Manuel Aronson (Ph.D., Pennsylvania State University, 1951) is Clinical Psychologist, Veterans Hospital, Albany, New York, and Instructor in Psychology, Albany Medical College. Leo Shatin (Ph.D., Harvard University, 1951) is Chief Clinical Psychologist, Veterans Hospital, Albany, New York, and Associate Professor in Psychology, Albany Medical College. Mrs. Jeanne Cook (M.A., Albany State College for Teachers, 1945) is Speech Retraining Instructor, Veterans Hospital, Albany, New York.

approach as social and psychological therapy for dysphasic patients is of rather recent origin. Zangwill (*16*) discussed the psychological state of the aphasic patient in the early and later stages of recovery from brain injury. He noted certain general principles associated with efforts at rehabilitation: compensation for injury to the central nervous system, the substitution of new responses, the use of direct training, and the need for vocational rehabilitation. Backus and Dunn (*3*) described their experiences with groups of patients in the clinical practice of speech rehabilitation, including aphasics. Although the classes were directed toward re-education of speech, they provided some opportunities for psychological treatment. Among the advantages cited were the opportunity to study the individual patient's needs, to gain insight into the nature of speech as social communication, and to observe the carry-over of new speech patterns into daily life. Social experiences were provided to assist in the acquisition of social techniques, while dramatic activities aided in the treatment of attitudes.

Backus (*1*) indicated the importance of the speech group's psychological climate and emphasized the need for activities which strengthened group cohesion. Backus (*2*) also described the need for an holistic approach to rehabilitation. She concluded that the individual's definition of the situation, his motivations and frustrations, and his course of life should be considered in the treatment program and its rationale. She pointed out that the aphasic patient's need for oral communication is most strongly felt within the group situation, and that interpersonal demands of the group may therefore facilitate social rehabilitation.

Shames (*10*) analyzed the relation between degree of homogeneity of the patients participating in group speech therapy and success in that therapy. He obtained sufficient evidence of the relationship between patient homogeneity and successful group treatment to warrant further exploration of his hypothesis.

Nielsen *et al.* (*8*) described the model treatment program for traumatic aphasics at Birmingham Veterans Hospital. It was a comprehensive approach which employed the specialized techniques of Neurology, Psychology, Social Services, and Speech Pathology. Recreational activities were encouraged, together with 'mental hygiene' and 'psychological conditioning.' Within this milieu, the language instruction attained a high level of success. Similarly oriented treatment programs have been conducted under the auspices of the United States Army (*7, 9, 11*). Wepman (*13*) discussed a model in-patient program for the treatment of aphasic adults, including full programs of social and psychological therapies. He has presented the many personal-psychologic desiderata (*14, 15*).

Corbin (*6*) analyzed her experiences with group instructional and treatment methods for veterans attending an aphasic clinic over a period of two and one-half years. The patients were designated as 'motor-aphasic' or as having 'dysarthric speech.' Although the emphasis was upon speech rather than upon social and psychotherapeutic influences, the latter assumed an important role in the training procedure. Corbin sought to raise group morale and felt that group speech therapy gave increased carry-over of re-learned language and adjustment to the world of normal speech. Turnblom and Myers (*12*),

observing the importance of patient-family interactions in determining the patient's motivations for speech rehabilitation, organized a group discussion program with families of aphasic patients. They concluded that their program did indeed aid the family to adjust emotionally to the problems of the aphasic.

Blackman and Tureen (*5*), impressed with the importance of staff and patient attitudes in attaining recovery of speech, instituted a series of group meetings designed to bolster the ego-strength of their aphasic patients. Nine patients aged 20 to 30 with head injuries dating back two to four years met at weekly intervals. In these meetings the patients expressed their inner feelings and resentments, later discussing more intimate problems after the group had become unified. The authors felt that associated disciplines such as teaching and social service were brought closer to the needs of the aphasic through this technique, thereby acting to reduce permanent invalidism. Blackman (*4*) discussed the socio-psychological situation of aphasics and described the group psychotherapeutic approach developed to meet their needs.

## Procedure

*Subjects.* All patients in the Albany Veterans Hospital with the diagnosis of aphasia, expressive or receptive, were drawn into the program. They came from both chronic and acute medical wards. Since the beginning of the program over a year ago, the group has met at weekly intervals for a period of one hour. The group has been fluid in the sense that new patients are added as previous members are discharged from the hospital. In spite of this movement, the presence of a number of long-term patients added a basic stability to the group. This core facilitated the integration of new members into the group.

TABLE 1. Aphasic group background (N = 21).

| *Variable* | *Mean* | *Range* |
|---|---|---|
| Age | 57.5 | 29–67 |
| Educational grade level | 8.9 | 3–16 |
| Months since last employment | 33.0 | 12–108 |
| Number of hospitalizations (Prior to current one) | 1.9 | 1–6 |
| Total months of current hospitalization | 13.9 | 2–96 |

The patient group membership was stabilized approximately at ten. The size of attendance at meetings varied somewhat depending upon the hospital discharge and admission rates. A total of 35 patients participated in the group program. Fourteen of this number attended only three meetings or less while 21 met with the group five or more times. The major content of the present report is concerned with the 21 patients who attended five or more times. Their mean attendance was 14.2 meetings, range 5 to 34. They are referred to as the 'aphasic group' and constitute the source from which were derived the majority of the impressions reported. Table 1 summarizes some background data for the aphasic group.

Except for one younger patient of 29, the members of the aphasic group ranged in age from 40 to 67 years with a mean age level of 57.5 years. Thirteen had no more than a grammar school education, five attended high school, and three were college graduates. Analysis of the occupational distribution revealed that fifteen members of the group were unskilled or semi-skilled laborers, one was a farm-

hand, and five came from the engineering-managerial-professional levels. Nineteen of the patients were white and two were negro. Eighteen were native born and three of foreign extraction. Three patients were widowed, nine were single, and nine married.

The cause of aphasia for nineteen of the patients was cerebral vascular accident. One had skull fracture and one a post-operative aneurysm. Seven patients were capable of free ambulation, ten were incapable of ambulation without a wheelchair, and four were classified as having limited ambulation, *i.e.*, ambulatory only in the clinic. The severity of illness was further reflected in terms of degree of self-care. Nine patients were capable of full self-care, (feed self, care for personal hygiene, and bathroom needs), nine were capable of limited self-care (feed self but unable to care for other personal needs), and three were incapable of any self-care. The classification of degree of speech impairment was as follows: five extreme, five severe, four moderate, and seven mild.

*Treating Methods.* At the start of the program, patients showed overt signs of frustration whenever they attempted to speak in the group. They employed several defensive mechanisms on this account, but most commonly they tended to withdraw from this situation which made demands upon speech. More and more, they relied upon non-verbal techniques to make known their wants. Initial efforts to develop a group speaking program therefore met with considerable resistance and it was necessary to resort to a variety of activities in order to achieve some degree of intra-group cohesiveness. These activities constituted a continuum from the non-verbal at one pole (*e.g.*, rhythm group) to the completely verbal at the other (*e.g.*, group-centered discussion). Seldom was interest sustained in any single activity, especially at first. It was therefore necessary to shift techniques and activities from time to time in order to maintain the necessary interest and group cohesion. The techniques are described below, in sequence from the least verbal to the most verbal.

A. Music rhythm group:[1] Music is a universal language in the sense that there are few people incapable of responding to it on some level. The use of rhythm instruments by the patients played to the accompaniment of well-known marches, waltzes, and popular songs was quite helpful during the initial phase of this program in the attainment of a feeling of group unity. So reluctant were patients to talk in the beginning that the very matter of simple introductions was a difficult task for the group. Rhythm band activity served several purposes: (1) It was a group activity, and each man was therefore given the opportunity to work with others; (2) it was a vehicle whereby the individual patient released pent-up feelings through motor action; and (3) it emphasized rhythm, an essential aspect of speech.

B. Group singing: The rationale for the use of rhythm instruments is also applicable to group singing, with the additional advantage that group singing utilizes the voice and speech. All patients participated despite their speech limitations, even when this meant only to hum along with the group. Old and familiar tunes occasioned difficulty only for the most severely disabled, but more recently

[1]Rhythm group facilities were provided through the courtesy of the Hospitalized Veterans Music Service of the Musicians Emergency Fund, Inc., New York.

popular songs caused difficulty for a majority of the patients.

C. Story time: As the patients became more comfortable in the verbal situation, stories by well-known writers such as O. Henry and Sinclair Lewis were read to them. Discussion of the content and meaning of the tale always ensued. One short mystery by S. S. Van Dine was particularly successful. After hearing the story and all essential clues, the group became quite active in its analysis of the tale and in its attempt to ascertain the villain.

D. Speech games: These helped the patients to utilize their verbal abilities and permitted the leaders to observe patients' reasoning power. A form of 'Lotto' permitted direct concentration upon vocabulary. The interpretation of proverbs helped the leaders to estimate the abstractive levels of the various members. Responses to proverbs often yielded clues pertaining to the personality structure. Speech games often gave rise spontaneously to emotionally charged discussions.

E. Puppets: Opportunity was provided the groups to engage in unstructured but dramatic situations involving puppets. This medium was less structured than the speech games. Male and female puppet characters of varying roles and age levels were used, and informal participation was encouraged.

F. Tape recordings: The tape recorder was used both diagnostically and therapeutically. It permitted the patient to evaluate changes in his speech from time to time by comparing recordings of his voice. The opportunity to record and hear their own speech was a new experience for all the men. Each man approached the recorder with some apprehension, and several times the recording session constituted a near-catastrophic experience. The latter does *not* constitute contra-indication for the use of this equipment. Reactions to playbacks varied. Two patients became depressed and cried, several were fairly elated because they felt their speech was not as bad as they had suspected. The frustration of inability to say all that one wishes to was observed in every instance. Each man was recorded individually, but in the presence of the whole group. The group was always attentive to this procedure. The efforts of each man touched off considerable discussion in every instance. The discussion was primarily of a supportive type. Words of encouragement and praise were given sincerely and spontaneously even by the most hostile members of the group. This, more than any other activity, invariably led to sympathetic display among the members of the group.

G. Group-centered discussions: As self-confidence increased and as relationships among the members of the group solidified, group discussions became possible without the aids previously described. A variety of feelings were explored, including attitudes toward each other, toward group leaders, and toward hospital personnel and routine. Discharge was discussed, with its implications for economic and/or social dependence upon others. The patients evaluated their physical limitations, as well as their problems of interpersonal and intra-familial relationships. Gradually they became more capable of perceiving themselves against the background of family and society. There was movement from fixation upon speech *per se* to a consideration of self as a person confronted with the problem of adjusting to everyday living.

Refreshments[2] were served at all meetings and successfully enhanced the informal social atmosphere. The methods described above were presented in varied sequence, according to the developing needs of the patients. During the initial meetings there was greater emphasis upon nonverbal techniques. This gave way slowly to the verbal methods of later meetings, but considerable variety was necessarily employed to maintain the group at a high level of stimulation and interest. Complete reliance upon group discussion alone was not feasible. Occasionally the group carried on spontaneously for several sessions, but invariably a retrogression would set in. When this occurred it became essential to introduce a planned activity in order to help the group reestablish integration and unity. Hence, this pool of varied techniques was held available and employed with flexibility in order to maintain maximum motivation.

*Methods of observation.* This program was conceived from the standpoint of treatment rather than research, hence no formal experimental design was projected. For the purpose of reporting these experiences, several types of observations were made and survey data gathered. These are described below.

A. Patient reactions. The patients' reactions to the speech program were evaluated by three separate approaches: rating, interview, and qualitative analysis of group behavior. The patient ratings and interviews were conducted during the months of May and June 1955, with all patients in the treatment group who had received five or more treatments. There were eleven such patients. A twelfth was excluded because he was unable to comprehend the questions.

1. Ratings. A seven-item, five-point check list was constructed for the purpose of eliciting the patients' impressions of the aphasic program. The items were geared to reflect feelings toward the group meetings and the group leaders, toward own speech, and finally toward relationships with others. The patients were also asked to rank, in order of preference, the various activities employed. The scale was administered to each of the patients by an experienced psychological examiner in an individual interview situation. Each item was read aloud by the psychologist, and, when necessary, explanations were given until the patient understood the question satisfactorily. It was then rated by the patient on a 5-point scale (1 through 5), with 1 indicating the most favorable or satisfied response for that item and 5 indicating the least so (most rejecting).

2. Interview. This was structured so as to clarify the responses to the check list. It also enabled the patient to express significant feelings and attitudes not otherwise covered by the items. Since the interview was held after the check list had been administered, it made possible a qualitative exploration of the patient's responses without contaminating his answers to the items on the check list.

3. Analysis of group behavior. Complete notes were kept for each of the group meetings. These were analyzed from the standpoint of the members' individual reactions and intragroup dynamics.

B. Observations by hospital personnel. Hospital personnel working

[2]These, together with the services of two volunteers, were provided through the courtesy of the American Red Cross. The Albany Veterans Hospital Special Services Department made possible this assistance.

closely with the patients were interviewed to determine whether the group program affected patient behavior in day-by-day routine. These included ward physicians, nurses, and a variety of rehabilitation therapists, including corrective therapy, educational therapy, manual arts therapy, occupational therapy, and physiotherapy.

The interview was standardized, and based upon a ten-item questionnaire. The interviewee responded to each item with 'yes' or 'no' or 'cannot say,' and was then encouraged to elaborate upon his replies. The items were designed to elicit the staff's observations and opinions concerning the effect of the program on the patient's speech, feeling of well-being, and interpersonal relationships. The respondent was provided opportunity to air his satisfaction or dissatisfaction with the results of the program.

C. Observations by group leaders. As a final step, the group leaders held periodic conferences in which they analyzed their subjective impressions of the group program. In these sessions they integrated and coordinated their judgments concerning the meaning of this program to the patients. They pinpointed the main difficulties encountered in establishing such a program and discussed methods which might be employed to meet these difficulties.

## Analysis of Findings

A. Patient reactions.

1. Ratings. These were elicited from all patients in treatment at the time of this report, eleven in number. Table 2 presents the group mean self-ratings and range for each of the 7 items. It will be recalled that each item was ratable 1 to 5, and a low rating was in the favorable direction. The rank order number of the mean rating for each of the 7 items is listed in the final column of Table 2. Rank order number 1 indicates most favorable response, rank order number 7 least favorable.

The data reflected in Table 2 are suggestive rather than definitive, for they are too sparse to justify further statistical treatment or significance tests. They do suggest that the patients responded most favorably to those items reflecting attitudes toward the group procedures, while items concerned specifically with the patients' perception of change in speech or feelings about speech received the lowest ratings. In summary, the group responded quite favorably toward the program as a whole and toward the manner in which it was conducted,

TABLE 2. Patient ratings of speech program (N = 11).

| *Item* | *Mean Rating* | *Range* | *Rank Number** |
|---|---|---|---|
| 1. Satisfaction with meetings | 1.73 | 1–3 | 2.5 |
| 2. Meetings relaxing vs tensional | 1.82 | 1–4 | 4 |
| 3. Effect on own speech | 2.27 | 1–5 | 6 |
| 4. Effect on *feelings* about own speech | 2.44 | 1–5 | 7 |
| 5. Desire to continue with group | 1.73 | 1–4 | 2.5 |
| 6. Value of group leaders in solving speech problems | 1.54 | 1–3 | 1 |
| 7. Meetings as aids to social interaction | 2.09 | 1–5 | 5 |

*Lowest score constitutes highest degree of acceptance and highest rank.

and expressed a need to continue with it.

At the end of the check list, the patients were asked to rank the several group activities in order of preference. Only two of the eleven patients were able completely to rank all eight activities in order of preference. Four listed two to four preferences, four others were able to list but a single preference, and one patient could not designate any preference.

The activity which seemed to impress itself most on the minds of the patients was that of recording and listening to one's voice. Although only two patients could give complete rankings, nine of the eleven patients did include this activity in their rankings. More significantly, seven patients gave it an extreme rank (upper *or* lower). Five members of the group gave it a number one ranking, one patient a number two ranking, and one patient ranked it last in order of preference. Hence, it appears that this activity elicited a more clear-cut reaction than did any of the others. It is reasonable to hypothesize that attitudes and emotional reactions aroused by self recordings are intense, whether positive *or* negative. Inspection of the rankings further indicated that rhythm band activity and group singing were also high in order of preference, but not to the extent of tape recordings.

2. Interview. All patients but two expressed a positive attitude toward the program. One of the two exceptions voiced dissatisfaction with his speech progress, and the other criticized the general intellectual level of the group. The interviews revealed the definite existence of a generalized 'halo' reaction to the sessions. The majority of patients expressed a favorable attitude toward the group program. Where this was found, generally positive attitudes were also expressed toward one's own speech, group leaders, ward physicians, and hospital care. Only the two patients of high educational level and with mild impairment were capable of independently variable positive or negative opinions depending upon the item or phase of the program under consideration.

3. Analysis of group behavior. An outstanding feature of the notes on the weekly meetings was the gradual change which they indicated in the patients from strong resistance to almost complete acceptance of the *idea* of group psychotherapy. Resistance seemed to result from two factors: the usual self-absorption of the physically damaged or ill and an ingrained belief that psychology is for 'crackpots.' It was necessary in the beginning to introduce every activity primarily as an aid to speech, since all were willing to admit some speech disability but none wished to admit any need for psychotherapy. As an example, it is of interest to record the changes in attitudes observed in one of the patients:

> Mr. R., alone in the world as were the majority of these patients, exemplified those who found a circle of friends in the group. His initial apprehension and resistance ('They're working me too hard already; I don't need it.') cleared as the hospital schedule fell into place and his attendance at the group meetings became the high point of his week. Beginning with a wholehearted enjoyment of the refreshments, he progressed to an interest in every group activity, followed conversations closely, and began to enter into them spontaneously —if not pertinently. For example, at the end of a lively political discussion wherein even one totally speechless patient had participated by drawings and by gestures, Mr. R. declared himself: 'I'm in favor of the whole Salvation

TABLE 3. Percent 'yes' responses to group speech program in personnel questionnaire ratings.

| *Item* | *Physicians* | *Nurses* | *Rehabilitation Therapists* | *Combined* |
|---|---|---|---|---|
| 1. Knowledge of patient attendance | 100 | 100 | 100 | 100 |
| 2. Program's effect on patient speech | 50 | 80 | 65 | 65 |
| 3. Program's effect on patient rehabilitation | 67 | 54 | 54 | 58 |
| 4. Program's effect on patient relationships with nurses and attendants | 55 | 60 | 57 | 58 |
| 5. Were general effects beneficial? | 76 | 88 | 85 | 83 |
| 6. Disturbances increased | 6 | 0 | 0 | 1 |
| 7. Increased patient motivation for speech | 83 | 94 | 74 | 81 |
| 8. Program helps prevent patient speech deterioration | | | | |
| A. Speech | 88 | 100 | 88 | 91 |
| B. Interpersonal relationships | 88 | 100 | 85 | 88 |
| 9. More information and progress notes desired | 33 | 40 | 12 | 24 |
| 10. Interest in recommending | | | | |
| A. Aphasics | 100 | 100 | 100 | 100 |
| B. Other disabled | 100 | 54 | 100 | 88 |

Army!' Nor did he resent or misinterpret the ensuing laughter; he realized that it was with him rather than at him.

The ability to laugh at one's self and to laugh with others has been an obvious achievement of interpersonal action within the group. Rigidity, tension, and self-pity have been seen to disappear in the laughter of a group drawn together by a common disability. The gradually developing group integration was accompanied by change in group attitude from distrust of psychotherapy to a feeling of welcome relief at the weekly opportunity offered for the expression and exchange of personal problems.

B. Observations by personnel. These were obtained in a structured interview through the administration of a personnel questionnaire. The 21 patients of the source group received a total of 68 ratings from three professional staff groups. Eighteen of these ratings were made by seven physicians, fifteen were made by eight nurses, and thirty-five by eleven rehabilitation therapists of the Physical Medicine and Rehabilitation Service.

Table 3 tabulates the percentage of 'yes' responses of each professional group to each item of the personnel questionnaire. A 'yes' reply was in the favorable direction for all items except items 6 and 9. A 'no' response to item 6 (Did disturbance increase?) was considered a positive reply and therefore a *low* 'yes' percent score would be in the favorable direction. A 'yes' reply to item 9 was not necessarily favorable or unfavorable.

The 'yes' percent score was derived by the formula:

$$\text{yes } \% = \frac{\text{yes responses}}{\text{yes} + \text{no} + \text{cannot say responses}}$$

Therefore, 'cannot say' responses were treated as negative responses for purposes of this analysis.

Inspection of Table 3, especially column 4, reveals that all personnel respondents expressed a favorable attitude toward the group program. This was well reflected in their recommendations of such a program for other aphasic patients (item 10A). In only 1% of the ratings was there any feeling that disturbance resulted from the program (item 6). Although 83% of the replies stated that the general effects were beneficial (item 5), the favorableness of response

dropped considerably when specific benefits and effects were individually considered: speech benefits, 65% favorable, relationships with other patients, 58% favorable, and relationships with personnel, 58% favorable (items 2, 3, 4). Eighty-eight percent believed the program helped to prevent further deterioration in speech and 91% were of the opinion that it helped to prevent further deterioration in social relationships (item 8B). There was also fairly general agreement (81%) that the program increased the patients' motivation to communicate with others (item 7).

In 24% of the ratings, the staff indicated a desire to receive more information concerning the program's progress than was actually received from the group leaders (item 9). This desire for information pertained to the progress the patient was making in the group and to information the group leaders might transmit which could be applied to the daily ward management of patients. The remaining 76% of the ratings indicated that further information was not required, the staff having been kept sufficiently well informed. Finally, 88% of the replies were in the affirmative direction with respect to the question of recommending a similar program for other disabled patients including geriatric and chronic medical problems (item 10B).

TABLE 4. Agreement among personnel groupings in ratings of benefits to patients.

| *Groups Correlated* | *Rho* | *Significance Level* |
|---|---|---|
| Physicians with rehabilitation therapists | .94 | .01 |
| Nurses with rehabilitation therapists | .71 | .05 |
| Physicians with nurses | .69 | .05 |

The extent to which the three rating groups (doctors, nurses, rehabilitation therapists) agreed on the order or rank of the benefits (items covered by personnel questionnaire) derived from the program was evaluated. The mean rating score for each of the items for each of the three groups was determined. The mean scores for each of the items were then ranked from high to low for each group and rank order correlations between groups were calculated. Table 4 reports these correlations together with their significance levels. A review of the mean score for each of the items for each of the three groups indicates that the nurses have a somewhat different perspective than do the physicians or rehabilitation therapists. This perhaps is due to the nature of their contacts, which are more continuous and include a broader segment of the patient's life span. The nurses are relatively more enthusiastic about the program's favorable effect upon patient speech and motivation for speech. They also concur more fully with the view that this program decelerated deterioration of speech and of interpersonal relationships.

*Observations.* These comments were derived from observations made by the group leaders. Several conferences were held in which these observations were evaluated and their implications for this and similar programs analyzed. It is emphasized that they are qualitative in nature and made from a clinical viewpoint. They do not come from controlled experiments or statistical tests of significance.

The aphasic patient's identification with the group is achieved slowly. In addition to the usual adjustments necessary for adequate group relationships, the aphasic patient has the

further handicap of limited expressive and receptive communication. This, together with his initial self-absorption and the strangeness of the new situation, constitutes a formidable barrier to interaction. However, once the patient discovers that all present have speech difficulty he shows greater evidence of striving toward group identification. Where total inattention continues beyond several meetings, it may predicate general progressive deterioration. It is a definite indication for discontinuance from the group.

Since group therapy helps to reduce anxiety in aphasic patients, it assumes practical importance from the standpoint of speech re-training. With the concomitant aid of group psychotherapy, more time in individual speech sessions can be given to instruction and less to support of the patient's ego.

Periods in group therapy where the tape recorder was employed were productive in two ways. First, members of the group gave support and encouragement to inexpressive patients by praising them for their effort, and this practice resulted in more persistent effort in individual speech re-training. Secondly, it increased the ability for self-criticism. This was important for patients who tended to be over-active or euphoric and did not 'hear' their own defective speech.

The speech instructor also noted a carry-over from individual lessons to group sessions. Rapport with the speech instructor can be rather quickly established and communication may go well in individual treatments, but the instructor has few means of knowing how well instructions are being carried out in group situations. Group therapy provides a social speech situation wherein the speech instructor can observe the patient's ability to translate into actual communication the skills he has been learning.

The aphasic feels extremely threatened by the very notion of damage to his brain. He often attempts to blame his difficulties on a variety of other, less threatening, conditions. Repeatedly, patients blamed their communication difficulties upon their teeth, their hearing, and similar disabilities. However, the patients did come to accept a simple, carefully phrased explanation of their defect when this was given in an atmosphere of support and reassurance.

The aphasic patient finds it difficult to maintain sustained interest in any single activity. It is therefore necessary to shift techniques frequently in order to maintain maximum group cohesion. The patient, however, must be prepared carefully for shifts and for new programs. Although he may lose interest in the on-going activity, it remains the known and familiar, and he is unwilling to shift over to another. Careful preparation and structuring must be given to every shift of program. The patients were told why an activity was recommended. The group leader's attitude is also significant. Only insofar as he takes the new venture seriously does the patient view it so.

Although it was markedly heterogeneous in degree of illness and in background, the group derived profit from the program. However, it is suggested that homogeneous groupings are desirable when this is feasible. Grouping together of patients with the same general degree of communication impairment leads to more group movement and progress than does a heterogeneous grouping.

The group leaders had the extensive use of an excellent volunteer service. It was found that such personnel could make a fine contribution in a variety of areas. In addition to providing and assuming responsibility for the refreshments served at each meeting, they also contributed to specific programs by leading group singing and playing the piano for rhythm band sessions. Their mere presence gave a sympathetic and informal atmosphere to the meeting. This was important to all patients and especially to those who had limited contacts outside of the hospital environment.

The efforts of the several rehabilitative disciplines are indeed effective when the workers plan an integrated approach. In this project, the educational (speech) therapist was a coleader for the group and gave individual speech lessons to group members. She could observe her patients in social settings not available to her before, and she utilized information thus gained in speech re-training. Furthermore, she brought interesting activities and content into the group meetings at times when verbal discussion *per se* was rejected by the patients. The clinical psychologist heightened the patients' motivation to interact socially, lessened the ever-present threat of general apathy, and served as psychological consultant to the educational therapist. The Chief of the Physical Medicine and Rehabilitation Service made available his complete facilities to assist in this program. The several hospital sections and services concerned with the welfare of these aphasic patients were gradually forged into a more close-knit and integrated treatment unit—or more accurately, treatment complex.

## Summary

A group socialization and psychotherapeutic program conducted with 21 male aphasic patients in a general hospital is described. The primary orientation was toward emotional difficulties and interpersonal relationships of the patients rather than correction of speech *per se*. Various observations were made including psychological interview and ratings by patients, qualitative analysis of group behavior, and questionnaires administered to hospital personnel (doctors, nurses, rehabilitation therapists). The reactions of the patients and personnel were quite favorable to this program. General observations and comments were presented concerning the group program.

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# Criteria For Establishing The Need For A Speech Appliance

Duane C. Spriestersbach

Speech pathologists who are concerned with the habilitation of those with cleft lips and palates are frequently called upon to comment on the management of individual cases. It is not unusual for the referral to indicate that everything has been done from a surgical and dental standpoint. Such referrals are usually made because the speech is not as acceptable as it might be and the speech pathologist is asked to determine whether a speech appliance is indicated. The following discussion concerns some of the guideposts which the speech pathologist may follow *in such a situation* to arrive at his recommendations.

## General Principles

Before considering the possible criteria which the speech pathologist should use in formulating a recommendation, it may be well to consider the following general principles.

1. Whatever is recommended or done in one specialized field must be related to the program of total care of the child.

Duane C. Spriestersbach (Ph.D., State University of Iowa, 1948) is Associate Professor of Speech Pathology and Audiology, State University of Iowa. This article is adapted from a paper presented at the 1955 Convention of the American Speech and Hearing Association in Los Angeles.

As has been said many times in the past, the problems of the child with a cleft lip or palate can best be handled through a pediatric approach, in which the child's welfare provides the central and unifying focus. Obviously, the speech pathologist must keep this principle in mind as much as any of the other specialists concerned.

It is important that the current status of the physical condition of the cleft be determined: These questions should be asked: (a) Does the person have an inoperable condition? (b) Is the appliance to be considered as an interim device? (c) Is the appliance to be used primarily to obturate an opening in the hard palate or is it needed primarily to provide a more adequate velopharyngeal mechanism? (d) Does the person have other congenital anomalies which are more inimical to health than the cleft of the palate? The speech pathologist cannot let his concern for the individual's speech cause him to overlook such considerations if the total welfare of the individual is to be served most effectively.

2. There are few, if any, generalizations designed to apply to all individuals with clefts.

Individuals with clefts differ not only with respect to the nature of their clefts but also with respect to

their potentials for growth, their behavior, and especially their facility for compensating for the inadequacies resulting from the cleft.

It must be remembered, also, that it is not enough to make an evaluation and assume that the evaluation will stand for any length of time. For example, the size and shape of the nasopharyngeal structures involved in velopharyngeal closure are not static. Among the structures involved, the adenoids probably exhibit the most dramatic changes in size and shape. Subtelny (*10*) has pointed out that after six months to one year of age the adenoidal tissue begins to grow rapidly, possibly occupying as much as one-half of the nasopharyngeal cavity by two to three years of age. The greatest bulk is attained somewhere between the ages of 10 and 15 years. During this period, the palatal shelf is being carried to lower levels in relation to the cranial base.

Pruzansky (*8*) has also emphasized the need for being aware of the physiological changes which occur with time. He cites the example of a six and a half year old child with a repaired cleft of the hard and soft palate who had speech 'within the range of normality.' Three and a half years later the child had developed a 'definite quality of hypernasality.' One of the sources of the difficulty appeared to be that the velum was no longer making contact with the posterior pharyngeal wall. What had appeared to be a highly successful operation with respect to function was not to be so considered some three years later. Evaluations which do not take these potential changes into account may prove to be misleading and even harmful in relation to long-range habilitative planning.

Later in this paper mention will be made of the maturational considerations involved in the production of some speech sounds. These constitute another example of the changes that take place within the individual with time.

As a consequence of the many possible variations, not only from individual to individual but also within each individual in time, highly individualized and detailed diagnostic procedures are a necessary preliminary to any habilitative planning.

3. One of the primary goals, if not the primary goal, in the management of clefts of the palate is improved speech. To the extent that this objective is agreed upon success in management is to be measured in terms of the improvement noted in speech. This statement will be agreed to, although perhaps grudgingly, by all specialists concerned with the management of clefts. Yet, many management decisions are still being made as though speech improvement were a peripheral issue.

4. Speech problems, involving both articulation and voice, of the person with a cleft palate have multiple causes.

Effective diagnosis includes the evaluation of such factors as the teeth, the width of the cleft, the size of the upper and lower arches, the carriage of the tongue, the effectiveness of the closure of the velopharyngeal port, the activity of the jaws and lips, the general loudness level of the speech, and the articulatory errors. However, these factors should not be viewed seperately with little or no recognition of the context in which they operate. Evaluation of the highly complex phenomenon of speech requires that recognition be given to

the interaction of all of the factors just mentioned, and many others. Increasing the precision of the measurement of these individual factors without evaluating the relationships among them will contribute little to the understanding of the total problem.

5. Evaluation of the effectiveness of the velopharyngeal mechanism cannot be done adequately by inspection of the oral cavity, with or without phonation.

In a series of recent articles, Calnan (*2, 3, 4*) considers some of the problems in evaluating the effectiveness of velopharyngeal closure. He points out that the extent of the eminence of the levator is more important for closure than the length of the soft palate. He notes that it is important to determine the level of the hard palate in relation to the level of the atlas if one wishes to evaluate the possible significance of the presence of Passavant's cushion. In this connection he observes that the cushion is frequently too low to provide a mass of tissue which will assist in closure. Calnan has also pointed out that casual inspection of the closure pattern of the velopharyngeal port during speech is far different from the more reflexive type of movement observed during swallowing. Furthermore, he points out that closure is not complete during the phonation of the open vowels and yet it is only during the phonation of these sounds that the closure can be directly observed. The lack of complete closure on the open vowels has been confirmed by many investigators, including Wolfe (*13*), Harrington (*5*) and Williams (*12*). The work of Buck (*1*) points up the fact that closure or attempts at closure of the velopharyngeal port by individuals with clefts is accomplished primarily by vertical movements of the velum, movements which cannot be adequately appraised by direct inspection of the oral cavity.

Pruzansky (*8*) notes that the limitations of peroral inspection include the abnormal posture which necessarily exists during the inspection. This may result in views of the structures involved in velopharyngeal closure which are unique to that particular posture. Thus, generalizations may not be justified concerning closure during speech on the basis of such observations.

Ricketts (*9*) has suggested that in an assessment of the conditions of the nasopharynx, evaluations should be made of 'the relationship and adequacy of all the structures that contribute to its size, shape and function.' He points out that the muscles of a given region adapt or accommodate to the individual conditions characterizing that particular region. As a consequence, it becomes important to be able to visualize the existing bony framework of an individual if one is to understand the function of the muscles attached to it.

As a result of these various observations it would appear highly desirable that radiographic data concerning the functioning of the structures involved in velopharyngeal closure be obtained from each individual with a cleft who is a candidate for speech therapy. This should be done regardless of whether a speech appliance is used in the habilitative process. These data should prove to be invaluable not only in connection with diagnostic procedures but also in evaluating the effectiveness of the program of habilitation.

6. The prescription of a speech appliance is not be to taken lightly.

To any responsible professional person the aspect of cost alone would be adequate cause for conservatism in this matter. However, even when cost is not an issue, there are other considerations which indicate the need for being cautious. Retention devices can be traumatic to the teeth to which they are attached and thereby may restrict the expected life of the teeth involved. Furthermore, what is to happen to the individual who has come to depend on the appliance for speech when his teeth are gone and retention of the appliance becomes difficult?

Perhaps an equally important problem is the inevitable trust that the layman places in a gadget. One of the most difficult problems the speech correctionist faces is to convince the defective speaker that all that the speech correctionist can do is to show him the road and provide him with a crutch if one is indicated. But there is no way to walk the road for him. A speech appliance given to the 'shopper' may create more problems than it solves.

## Criteria for a Speech Appliance

Pruzansky (*6*), in considering the criteria for surgical closure of a cleft palate, discusses general factors and local factors, which can be applied with equal relevance to the criteria for a speech appliance. For the purposes of this discussion, speech factors may be added.

*General Factors.* Under general factors Pruzansky includes questions concerning all aspects of the health of the individual, the attitudes and environment of the family, and the availability of professional resources within the community. Naturally, if there are no provisions for follow-up services for the individual, a prosthetic appliance should not be recommended since it must be modified and serviced to keep pace with growth. Furthermore, if the family is unable to provide proper supervision in the care of the appliance and the child's teeth, the prescription of an appliance is probably contraindicated. Some clinicians also feel that children with borderline intelligence or below are not good candidates for a speech appliance because of their inability to use the appliance effectively.

*Local Factors.* Under local factors Pruzansky considers the quantity and quality of tissue bordering the cleft, the width of the cleft, the length of the soft palate, the configuration of the nasopharynx, and the myofunctional analysis. It must be kept in mind that while surgery may not be indicated at this time, it may be indicated at a later date. If surgery is to be deferred, are the child's speech problems of such a magnitude that an interim appliance should be recommended? Pruzansky (7) states that if surgery is not recommended and if 'the child is entering a phase in its development wherein the fundamental patterns of speech are being laid down, then it is our policy to recommend a speech appliance.' The prescription of an appliance in such an instance to insure normal speech development seems to be based on an assumption which needs to be tested. However, since there are no obvious contraindications for such a policy, the speech pathologist will frequently wish to adhere to it in view of his

concern with normal speech development.

*Speech Factors.* The clinician should be aware of the factors discussed by Pruzansky concerning the welfare of the total child. However, answers regarding these factors nearly always come primarily from the medical and dental members of the team. It would seem that the speech pathologist too often becomes concerned with these questions and forgets to exploit the information which can be obtained by observing the individual's speech. He forgets that he is the specialist in this area and that if he makes a careful evaluation he has a significant and crucial contribution to make. His responsibilities include: 1. Evaluating the intelligibility of the speaker in relation to the need for a prosthesis; 2. Evaluating the nature of the articulation problem in relation to the limitations imposed by the cleft; and 3. Determining to what extent a prosthesis could be expected to correct such articulation problems as do exist.

First of all, the speech pathologist should make an evaluation of the individual's speech to assess the general intelligibility level. It is doubtful whether a prosthesis should be recommended for an individual who has speech that is easily understood and who is responding to communicative situations in a positive, outgoing fashion.

Secondly, if the individual's speech is difficult to understand or if he is reacting to such errors as he may have, the speech pathologist must determine whether the problems have any direct relationship to the cleft or whether they are maturational and functional in character. Too often it is assumed that a given five-year-old child with a cleft has poor speech solely because of the cleft, and that only surgery or a speech appliance can remedy the situation. The clinician overlooks the fact that such deviant sounds as [r], [l], [v], and [ð] may be the natural manifestations of immaturity and will not be appreciably affected by an appliance. Furthermore, one does not know for sure whether the sounds in error are due to the cleft. Sometimes it may be necessary to do some trial therapy to see whether the therapy alone will take care of the problem. The clinician should feel quite justified in saying that he cannot tell how important the structural deviations are and that he will have greater confidence in his recommendations after a period of therapy.

Finally, the speech pathologist must study the speech sounds which the child apparently cannot produce because of his cleft. The errors relative to these sounds should be classified in terms of the demands required of the articulatory mechanism to produce them. Is the error due to lack of adequate oral pressure or the facility with which the air stream is obstructed? If it is the latter, does the fault lie in the alignment of the dental arches, the condition of the anterior teeth, or the size and shape of the palatal vault? Some of these conditions can be corrected by the orthodontist without the use of a speech appliance. If the fault lies with inadequate oral pressure, the clinician must first rule out the possibility of anterior perforations of the vault which allow the escape of air and which are rather easily obturated by the prosthodontist.

As has been stated before, to determine whether or not there is adequate velopharyngeal closure properly requires radiographic information. It is helpful to know not only that there is inadequate closure but what potential exists for closure. Does the individual exhibit essentially vertical movement of the soft palate, or does he utilize adenoidal tissue which will atrophy in time, or has he developed considerable anterior movement of the posterior wall of the pharynx, or a combination of these? What is the individual's potential for developing more movement in this region? Does the amount of movement vary with the amount of effort employed during the production of speech? If it is decided that the potential for closure is poor or non-existent, and, as indicated earlier, further surgical procedures are contra-indicated, the recommendation of a speech appliance would appear to be justified.

In the case of the individual whose speech is nasal, it is doubtful that a prosthesis can be justified on the basis of nasality alone. The chances are that an individual who can produce satisfactory consonant sounds will not have a serious communicative handicap because of nasality (*11*). Furthermore, the clinician must not overlook the fact that the voice problem may also have a functional basis.

Having made his observations, the clinician is ready to make his recommendation; but only a recommendation, not a pronouncement. It is to be hoped that he will present his data to his medical and dental colleagues with the indication that their worth depends upon their joint consideration with the data obtained by the other members of the team, in what Pruzansky has called 'an atmosphere of multiprofessional collaboration.'

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# THIRTY-SECOND ANNUAL CONVENTION

*November 19-21, 1956, Palmer House, Chicago*

# AMERICAN SPEECH AND HEARING ASSOCIATION

**PROGRAM ANNOUNCEMENT**

(Some additional sections and papers may be announced later.)

**Saturday, November 17**

(Pre-Convention)

1:30 p.m. and 7:30 p.m.

Meeting of the Executive Council

**Sunday, November 18**

(Pre-Convention)

9:00 a.m., 2:00 p.m. and 7:30 p.m.

Meeting of the Executive Council

11:30 a.m.

Called Meetings of Association Committees

**Monday, November 19**

## CURRENT THEORY AND CLINICAL PRACTICE IN APHASIA: A SUMMING UP

9:00-11:55 a.m.

Chairman: Frederic L. Darley, State University of Iowa

Speakers:

Irwin Brown, University of Michigan
Virginia Carroll, Veterans Administration Hospital, Minneapolis
Jon Eisenson, Queens College
Robert Milisen, Indiana University
Robert H. Rossberg, University of Buffalo
Hildred Schuell, Veterans Administration Hospital, Minneapolis
Barbara S. Street, Veterans Administration Hospital, Minneapolis
Joseph Wepman, University of Chicago

Questions and Discussion

## GROUP THERAPY FOR CHILDREN WITH ARTICULATORY DISORDERS

9:00-10:25 a.m.

Chairman: Margaret H. Powers, Board of Education, Chicago

Panel Members:

Elise Hahn, University of California at Los Angeles
Gay Ann Carson, Palos Verdes Public Schools, California
Leo Buscaglia, Pasadena Public Schools, California
Irma Kratovil, Chicago Public Schools

Discussion

## PROFESSIONAL PROBLEMS: MEETING OF STATE DIRECTORS OF SPEECH CORRECTION

9:00-10:25 a.m.

Chairman: Martha E. Black, Illinois State Department of Public Instruction

General discussion: *Student teachers and public school speech correction programs.*

## STUTTERING: CONTRIBUTED PAPERS

9:00-10:25 a.m.

Chairman: Joseph G. Sheehan, University of California at Los Angeles

*The stuttering problem in Japan.* Frederick P. Murray, Santa Clara Schools, Santa Clara, California

*Interrelationships among certain behavioral characteristics, age, sex, and duration of therapy in a group of stutterers.* Frank J. Falck, Bill Wilkerson Hearing and Speech Center, Nashville

*The use of serpasil with stutterers.* Helen G. Burr and James M. Mullendore, University of Virginia

*A sentence completion test for stutterers.* Joseph G. Sheehan, University of California at Los Angeles

## CONTRIBUTED PAPERS IN AUDIOLOGY

9:00-10:25 a.m.

Chairman: Donald M. Markle, Bellevue Hospital Center, New York

*The importance of the occlusion effect, and the use of a frontally applied bone conduction receiver, in clinical bone conduction testing.* Ralph F. Naunton, University of Chicago

*An investigation of minimum perceptible changes of intensity at the threshold of hearing in normal and impaired ears.* Tina E. Bangs, Houston Speech and Hearing Center

*The diagnostic significance and clinical use of indirect tests of 'recruitment.'* Leanne A. Turner, Columbia-Presbyterian Medical Center, New York.

*The difference limen for intensity in functional deafness.* Bernard Anderman and Beatrice Reisman, Veterans Administration Regional Office, New York

*Abnormal auditory adaptation.* James F. Jerger, Northwestern University

Discussion

## CURRENT PRACTICES IN THE MANAGEMENT OF CLEFT PALATE: A REVIEW

10:30-11:55 a.m.

Chairman: H. Koepp Baker, Western Carolina College

(Section incomplete)

## DO OUR CURRENT PROGRAMS IN SPEECH AND HEARING MEET THE NEEDS OF TODAY'S ELEMENTARY SCHOOL CHILDREN?

10:30-11:55 a.m.

Chairman: Sara M. Ivey, University of Arkansas

*A special education team approach to speech correction.* John E. Robinson, Special Education Clinic, Hammond, Louisiana

*The Tennessee speech and hearing program: a cooperative effort of education.* Betty Carroway, West Tennessee Hearing and Speech Center, Jackson, Tennessee

*The Ohio speech and hearing program.* Elizabeth C. MacLearie, State Department of Education, Columbus, Ohio

*The unique speech and hearing program in Alabama.* Laura F. Wright, Alabama College

## RECENT RESEARCH IN ARTICULATION

10:30-11:55 a.m.

Chairman: Robert Milisen, Indiana University

*A study of motor ability of children with articulation defects.* Norma Lou Loetz, Vanderbilt University

*Consistency of articulation as a function of different test words.* Katherine Snow, Indiana University

*Methods of articulation testing to determine the effect of maturation upon speech deviations among children in the first grade.* McKenzie Buck, University of Florida and Eunice Trask Carter, Public Schools, Jacksonville, Florida

*Effects of long versus short latency between stimulation and response when training unfamiliar words.* Harriet L. Cohen, Public Schools, East Chicago, Indiana

*A study of the value of amplified headphone listening and immediate playback in the correction of functional articulatory defects.* Genevieve Arnold, University of Houston

Discussion

## SCREENING AUDIOMETRY

10:30-11:55 a.m.

Chairman: Aram Glorig, University of Southern California

Panel Members:

Marion P. Downs, University of Denver
Hayes A. Newby, Stanford University
Louis M. DiCarlo, Syracuse University
Donald G. Causey, Veterans Administration, Washington, D. C.

Discussion

## ASSESSMENT OF COMMUNICATION DISORDERS IN INFANTS AND YOUNG CHILDREN

2:00-4:55 p.m.

Chairman: Leo G. Doerfler, University of Pittsburgh

(Section incomplete)

## LISTENING ACTIVITIES IN ARTICULATION THERAPY

2:00-3:25 p.m.

Chairman: Mary Huber, Los Angeles State College

*The problem of perception.* Wendell Johnson, The State University of Iowa

*Hearing and speaking: an analysis of language learning.* O. Hobart Mowrer, University of Illinois

*Listening, an analytic process.* Empress Y. Zedler, Southwest Texas State Teachers College

*Language stimulation activities in foreign countries.* Sue Earnest, San Diego State College

Discussion

## EXPERIMENTAL PHONETICS

2:00-3:25 p.m.

Chairman: James F. Curtis, State University of Iowa

(Section incomplete)

## RESEARCH IN CLEFT PALATE

3:30-4:55 p.m.

Chairman: Eugene T. McDonald, The Pennsylvania State University

*Speech changes after pharyngeal flap surgery.* John M. Palmer, University of Washington

*Selected factors related to the ability of cleft palate speakers to convey information.* Vilma T. Falck, Middle Tennessee State College

*Clinical cephalometry in cleft palate rehabilitation.* McKenzie Buck, University of Florida

*Laminographic study of vowels produced by cleft palate speakers.* Joanne Davis Subtelney, Rochester, New York

*Relationships between vowel phoneme and ratings of nasality.* Rolland Van Hattum, Board of Education, Rochester, New York and Eugene T. McDonald, the Pennsylvania State University

Discussion

## VOICE DISORDERS: THERAPEUTIC AND RESEARCH CONTRIBUTIONS

3:30-4:55 p.m.

Chairman: Virgil A. Anderson, Stanford University

*Applying the 'team approach' in therapy for voice disorders.* Lester L. Hale, University of Florida

*Vowel and consonant influence on the perceived hoarseness of syllables.* W. R. Dopheide, Western Michigan College of Education

*Fundamental frequency analysis of harsh voice quality.* Ned W. Bowler, Long Beach State College, California

*Voice therapy with children.* Wilbert L. Pronovost, Boston University

Discussion

## IMPROVING ARTICULATION THERAPY

3:30-4:55 p.m.

Chairman: Ruth Beckey Irwin, The Ohio State University

*Prevention of speech problems in grades one, two, and three.* John B. Mader, Michigan State University

*Role of the speech therapist in speech improvement program.* Milton Eastman, Illinois State Department of Public Instruction

*What children say and do: guides in planning.* Jane E. Beasley, Columbia University

*Therapy for speech retarded children.* Empress Y. Zedler, Southwest Texas State Teachers College

*Evaluation of speech therapy.* Sheila G. Morrison, The Ohio State University

Discussion

General Session of the Association

8:00 p.m. Presidential Address

8:30 p.m. Business Meeting of the Association
Reports of Officers and Committees
Election of Officers and Council Members

**Tuesday, November 20**

## PHOTOGRAPHIC STUDIES IN VELO-PHARYNGEAL AND LARYNGEAL MECHANISMS

9:00-11:55 a.m.

Chairman: John V. Irwin, University of Wisconsin

*What is a normal larynx?* William W. Fletcher, University of Minnesota

*The functioning of the normal larynx.* Paul Moore, Northwestern University

*Some laryngeal correlates of vocal pitch.* Harry Hollien, Baylor University

*Photographic views of the palato-pharyngeal valve in action.* Harlan Bloomer, University of Michigan

*X-ray motion pictures of the speech mechanism.* Robert Millard, Cleft Palate Clinic, Lancaster, Pennsylvania

Discussion: Audience discussion follows each presentation.

## ARTICULATION THERAPY IN JUNIOR AND SENIOR HIGH SCHOOLS: HOW TO IMPROVE TRAINING TECHNIQUES

9:00-10:25 a.m.

Chairman: Helen Sullivan Knight, Evanston (Illinois) Township High School

*Building in students the desire to correct their speech deviations.* Ruth G. Curtis, Public Schools, Grosse Pointe, Michigan

*Enhancing therapy materials through careful attention to method.* Marjorie Burkland, Community Consolidated Schools, Evanston, Illinois

*Helping students with impaired hearing to achieve better articulation.* Mary Rose Costello, Henry Ford Hospital, Detroit

*Improving self-hearing in students with articulation disorders.* Charles Van Riper, Western Michigan College of Education

## CONTRIBUTED PAPERS IN AUDIOLOGY

9:00-10:25 a.m.

Chairman: William F. Waldrop, St. Luke's Hospital, Chicago

*Role of the audiologist in a pediatrically co-ordinated team for diagnosis of neuro-psychiatric problems.* Jack Rosen, San Francisco Hearing and Speech Center and Ernest Wolff, Mount Zion Hospital, San Francisco

*Audiometric measurements by EEG.* A. J. Derbyshire, Harper Hospital, Detroit, A. A. Fraser, Detroit League for the Handicapped, and Mary McDermott, Children's Hospital of Michigan, Detroit

*Use of Audio-EEG in differential diagnosis.* Mary McDermott, Children's Hospital of Michigan, A. A. Fraser, Detroit League for the Handicapped, and A. J. Derbyshire, Harper Hospital, Detroit

*Some observations on the conditioning of infants to sound.* Clay L. Meritser, University of Pittsburgh

*The figure drawings of children with impaired hearing.* Joan Murray, Columbia-Presbyterian Medical Center, New York

Discussion

## SELECTION OF HEARING AIDS

9:00-10:25 a.m.

Chairman: Ira J. Hirsh, Central Institute for the Deaf

Panel Members:

Moe Bergman, Hunter College, New York
Aubrey Epstein, University of Pittsburgh
Kenneth O. Johnson, San Francisco Hearing and Speech Center
Thornton Zanolli, Society of Hearing Aid Audiologists, Detroit

Discussion

## CONTRIBUTED PAPERS ON ARTICULATION

10:30-11:55 a.m.

Chairman: Dorothy Huntington, Stanford University

*Relationships between selected auditory factors and articulation ability.* Charles V. Mange, Syracuse University

*Production of unfamiliar sounds as a function of preparatory cues and response reinforcements.* Margaret L. Rowe, Indiana State Teachers College

*Elective mutism in school children.* Lyda M. Smayling, Institute of Logopedics

*The use of projective therapy in a case of functional mutism.* Eric G. Allen, Speech Therapist, Hancock, Kossuth, and Winnebago Counties, Iowa

*The speech and hearing program at the training school.* Bernard B. Schlanger and Robert H. Gottsleben, Training School at Vineland, N. J.

Discussion

## STUDIES IN DELAYED SIDETONE

10:30-11:55 a.m.

Chairmen: William R. Tiffany and Clair N. Hanley, University of Washington

*A study of the psychogalvanic skin response to delayed sidetone.* Clair N. Hanley and William R. Tiffany, University of Washington

*The reading of messages of different types and numbers of syllables under conditions of delayed side-tone.* John W. Black, The Ohio State University

*Some effects of anesthetizing the articulators under conditions of normal and delayed auditory feedback.* Robert L. McCroskey, Jr., U. S. Naval School of Aviation Medicine, Pensacola

*The effects of disrupting the simultaneity of visual-aural communication channels to a speaker.* Gilbert C. Tolhurst, U. S. Naval School of Aviation Medicine, Pensacola.

## PROFESSIONAL PROBLEMS: MEETING OF DIRECTORS OF SPEECH CORRECTION IN CITIES OVER 200,000

10:30-11:55 a.m.

Chairman: Margaret Hall Powers, Board of Education, Chicago

## CONTRIBUTED PAPERS IN AUDIOLOGY

10:30-11:55 a.m.

Chairman: Hayes A. Newby, Stanford University

*The development of an extension to the Veterans Administration rating schedule for hearing disabilities.* Kenneth O. Johnson, San Francisco Hearing and Speech Center

*Audiometric evaluation of individuals tested for compensation purposes.* Gary Thompson, Houston Speech and Hearing Center

*An investigation into the clinical validity of the Doerfler-Stewart Test in the determination of non-organic hearing loss.* Aubrey Epstein, University of Pittsburgh and Norma T. Hopkinson, Eye and Ear Hospital of Pittsburgh

*Relation between EEG and ease of autonomic conditioning.* Kirti K. Charan and Robert Goldstein, Central Institute for the Deaf

*Oscilloscopic presentation of the galvanic skin response and its application to conditioned audiometry in normal and mentally deficient individuals.* John V. Irwin and Joseph E. Hind, Jr., University of Wisconsin

Discussion

## COUNSELING APPROACH TO HUMAN PROBLEMS

2:00-3:25 p.m.

Chairman: Joseph M. Wepman, University of Chicago

Speaker:

Carl R. Rogers, The Counseling Center, Professor of Psychology, University of Chicago

Discussion

## LINGUISTICS AND ITS CONTRIBUTION TO SPEECH SCIENCE

2:00-3:25 p.m.

Program Sponsor: John W. Black, Ohio State University

Chairman and Discussant: J. Milton Cowan, Department of Modern Languages, Cornell University

*The role of linguistic criteria in the study of speech.* Morris Halle, Department of Modern Languages, Massachusetts Institute of Technology

*A laboratory study in phonology.* Martin Joos and William Newcomb, Departments of German and Linguistics, University of Wisconsin

*General metrics.* Harold Whitehall, Departments of Linguistics and English and School of Letters, Indiana University

Discussion

## CONTRIBUTED PAPERS IN AUDIOLOGY

2:00-3:25 p.m.

Chairman: James Egan, Indiana University

*Studies in listener reception of voice messages: the persistence of the effects of listening conditions.* Robert W. Peters, Mississippi Southern College

*Prediction of speech threshold from the pure-tone audiogram by multiple-regression technique.* Ira J. Hirsh and Robert C. Bilger, Central Institute for the Deaf

*'Error of Measurement' in the speech discrimination score.* Robert C. Bilger and Ira J. Hirsh, Central Institute for the Deaf

*Binaural versus monaural discrimination.* Donald M. Markle, Columbia-Presbyterian Medical Center, New York

Discussion

## RESEARCH IN PROBLEMS OF APHASIA AND LANGUAGE RETRAINING

3:30-4:55p.m.

Chairman: Irwin Brown, University of Michigan

*Observations concerning the phenomenon of temporary disorientation in the psychological evaluation of aphasic patients.* Robert H. Rossberg, University of Buffalo

*A psycholinguistic study of aphasia.* R. Darrell Bock, University of Chicago

*A study of 100 consecutive patients with aphasia.* Joe R. Brown and Josephine Simonson, Mayo Clinic

*The significance of Gerstmann's syndrome with respect to degree of neurological and psychological impairment in aphasia.* Ralph M. Reitan, Indiana University Medical Center

Discussion

## SPEECH AND LANGUAGE PROBLEMS RELATED TO CEREBRAL PALSY AND OTHER NEURO-MUSCULAR DISORDERS

3:30-4:55p.m.

Chairman: James C. Shanks, Jr., Indiana University Medical Center

*Speech training and the young cerebral palsy child.* Irwin Lehrhoff, Children's Hospital, Los Angeles

*A comparative study of speech changes associated with group speech therapy and group client-centered therapy with cerebral palsied adults.* Albert T. Murphy, Boston University

*The speech therapist's role in a pilot study of the Bobath method of treating a four-year old cerebral palsied patient during a twelve-month period.* Empress Y. Zedler, Southwest Texas State Teacher's College

*Language, speech and hearing before and after total left hemispherectomy.* Shulamith Kastein, Presbyterian Hospital, New York

*The electroencephalogram as an aid in diagnosing speech disorders in children.* Ruth M. Clark, University of Denver

Discussion

## STUTTERING: PROBLEM OF ONSET AND DIAGNOSIS

3:30-4:55 p.m.

Chairman: James V. Frick, The Pennsylvania State University

*Suggestions for a differential diagnosis of stuttering.* Asa J. Berlin, The Pennsylvania State University

*Some factors associated with the parental diagnosis of stuttering in young children.* Philip J. Glasner, Johns Hopkins University

*Research on the onset of stuttering.* Wendell Johnson, State University of Iowa

Discussion

## PROFESSIONAL PROBLEMS: CLINICAL FACILITIES AND SERVICES

3:30-4:55 p.m.

Chairman: Lester L. Hale, University of Florida

*The design and construction of speech and hearing clinic facilities.* Freeman McConnell, Vanderbilt University

*The integration of clinical service with student training.* Frank Robinson, Miami University, Oxford, Ohio

*Utilization of clinically related specialists and services in colleges without medical schools.* Mack D. Steer, Purdue University

Discussion: Audience discussion follows each presentation.

## EQUIPMENT, TECHNIQUES, AND INTERPRETATION OF GSR AUDIOMETRY

3:30-4:55 a.m.

Chairman: Frank M. Lassman, University of Minnesota

Panel Members:

Leo G. Doerfler, University of Pittsburgh
William G. Hardy, Johns Hopkins University
Jack Rosen, San Francisco Hearing and Speech Center

Discussion

## FILM THEATER

7:30-10:30 p.m.

Chairman: Henry M. Moser, Ohio State University

A mimeographed bibliography of films in speech and hearing will be given to each member attending. A feature of the theater will be THURSDAY'S CHILDREN which was voted the Best Documentary Short Subject for 1955.

Meeting of the Executive Council
8:00 p.m.

**Wednesday, November 21**

## STUTTERING: THERAPY IN ACTION*

9:00-11:55 a.m.

Through a presentation and discussion of the verbatim recordings of therapy sessions the panel members will present their clinical approach to the stuttering problem.

Chairman: George J. Wischner, University of Pittsburgh

Panel Members:

Wendell Johnson, State University of Iowa
George Shames, University of Pittsburgh
Dean Williams, Indiana University

Discussant: Charles Van Riper, Western Michigan College of Education.

## SPEECH ANALYSIS

9:00-10:25 a.m.

Chairman: Gordan E. Peterson, University of Michigan

*An investigation of patterns of vowel resonance.* William R. Tiffany, University of Washington

***The nature of the vocal cord wave.*** Ralph L. Miller, Bell Telephone Laboratories

*A psycho-physical study of vowel formant.* Patti Murray Grubb, Texas Technological College, Lubbock

Discussion

## MEDICO-LEGAL ASPECTS OF HEARING LOSS

9:00-10:25 a.m.

Chairman: S. Richard Silverman, Central Institute for the Deaf

Panel Members:

Aram Glorig, University of Southern California
Meyer S. Fox, Milwaukee, Wisconsin
Jerome R. Cox, Central Institute for the Deaf

Discussion

## CONTRIBUTED PAPERS IN AUDIOLOGY

9:00-10:25 a.m.

Chairman: Charles D. Parker, State University of Iowa

*The use of tympanic injections as an experimental control in masking research.* Maurice H. Miller, Columbia-Presbyterian Medical Center, New York

*A method for the ranking of hearing aids according to performance characteristics.* Kenneth O. Johnson and G. Donald Causey, San Francisco Hearing and Speech Center

*The effect of hearing aid use upon the user's hearing.* Ralph F. Naunton, University of Chicago

*A study of the variability of discrimination scores as a result of exposure to amplification and training.* Audrey K. Sprung and Maurice H. Miller, Columbia-Presbyterian Medical Center, New York

*Thresholds of aural overload versus bone conduction thresholds as measures of cochlear reserve in clinical otosclerosis.* Phillip A. Yantis, University of Michigan

Discussion

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*The Editor of the Association has arranged for the publication of the complete verbatim report of this general session. The Proceedings of this session will be available for $1.00 per copy. Subscriptions may be left at the registration desk during the Convention or they may be mailed to Dr. George A. Kopp, Secretary-Treasurer, American Speech and Hearing Association, Wayne State University, Detroit 2, Michigan. Subscriptions must be accompanied by the price of the Proceedings. It is expected that they will be mailed to subscribers about February 1, 1957.

## PRESENTATION AND CONSIDERATION OF VOICE PROBLEMS

10:30-11:55 a.m.

Chairman: Paul Moore, Northwestern University

(Several persons with voice problems will be presented. Critical points of diagnosis and therapy will be discussed.)

Panel Members:

I. P. Brackett, Southern Illinois University
Henry M. Moser, The Ohio State University
Hans von Leden, M.D., Northwestern University Medical School
Evelyn Y. Robe, Northwestern University
William Waldrop, St. Luke's Hospital, Chicago

Discussion

## PROFESSIONAL PROBLEMS: ADMINISTRATION OF SPEECH AND HEARING CLINICS

10:30-11:55 a.m.

Chairman: Harlan Bloomer, University of Michigan

*What should be the scope of academic instruction in a speech and hearing clinic?* Martin Palmer, Institute of Logopedics

*Under what departmental affiliations can the academic work of the speech and hearing clinic best be carried out?* Virgil A. Anderson, Stanford University

*What sources of financial support should be available to speech and hearing clinics?* James Curtis, State University of Iowa

Discussion: Audience discussion follows each presentation.

## VISUAL AND TEMPORAL PERCEPTION OF DEAF AND BRAIN INJURED CHILDREN

10:30-11:55 a.m.

Chairman: Louis M. DiCarlo, Syracuse University

*A study of the visual perception of deaf children.* Milton Brutten, Commonwealth of Pennsylvania

*An experimental study of the visual perception of orally educated deaf children.* Gordon M. Hayes, Salem School for the Deaf

*A study of the visual and conceptual organization of deaf children.* Elmo Knight, Buffalo Hearing and Speech Center

*A study of the perceptual development in children with brain injury.* James Gallagher, University of Illinois

*Basic considerations of spatial and temporal perception.* Ira J. Hirsh, Central Institute for the Deaf

Discussion

Business Meeting
2:00-3:25 p.m.

## STUTTERING: CONTRIBUTED PAPERS

3:30-4:55 p.m.

Chairman: Charles R. Elliott, University of Illinois, Chicago Professional Colleges and Division of Services for Crippled Children

*Selection of the stuttering symptom: a preliminary theory.* William H. Perkins and Lee E. Travis, University of Southern California

*Emotional content as a source of conflict in stuttering.* Richard A. Bardrick and Joseph G. Sheehan, University of California at Los Angeles

*The speaking time of the stutterer before and after therapy.* William D. Trotter and Louisa Brown, Saint Louis University

*An experimental study of some verbal cues as instigators to stuttering behavior.* George J. Wischner, University of Pittsburgh

Discussion

## SIGMA ALPHA ETA MAJOR PROJECT REPORTS

3:30-4:55 p.m.

Chairman: T. D. Hanley, Purdue University

*Test of sound discrimination.* Alpha Iota Chapter, University of Kansas, Richard L. Schiefelbusch, Advisor

*State requirements for certification of speech correctionists.* Alpha Beta Chapter, University of Michigan, Prudence L. Brown, Advisor

*An evaluation of the hearing acuity of 250 senior citizens.* Alpha Delta Chapter, University of Florida, McKenzie W. Buck, Advisor

## CURRENT PRACTICES IN THE TOTAL MANAGEMENT OF CEREBRAL PALSY

3:30-4:55 p.m.

Chairman: Mrs. Berneice R. Rutherford, Minneapolis

*Physical and neurological aspects.* Meyer A. Perlstein, M.D., Chicago

*Speech problems and their management.* Darrell J. Mase, University of Florida

*Psychological aspects and education practices.* Harriett E. Blodgett, Sheltering Arms Day School and Research Program for Mentally Retarded Children, Minneapolis

*Management of home problems.* Mary Marguerite Matheny, Walter D. Matheny School, Peapak, New Jersey

*Advanced education and vocation problems.* Robert J. Hohman, United Cerebral Palsy of Minnesota, Minneapolis

Discussion

## CONTRIBUTED PAPERS IN AUDIOLOGY

3:30-4:55 p.m.

Chairman: Robert Goldstein, Central Institute for the Deaf

*Binaural hearing.* Moe Bergman, Hunter College, New York

*Speech communication under extremely difficult conditions.* Earl D. Schubert, Cleveland Hearing and Speech Center

*Effects of lesions of the central nervous system on hearing.* Allan C. Goodman, Washington University School of Medicine, St. Louis, Mo.

Discussion

Meeting of the Executive Council
3:00 p.m.

# Book Reviews

YOUNG, EDNA HILL and HAWK, SARA STINCHFIELD. *Moto-Kinesthetic Speech Training.* Palo Alto: Stanford University Press, 1955. Pp. 176. $5.00.

This book is a revised edition of a work which appeared in 1938 entitled *Children with Delayed or Defective Speech.* The work is divided into two parts, the first of which is written by Edna Hill Young. Mrs. Young's name has long been associated with the moto-kinesthetic technique of speech training as its originator and, probably, most successful practitioner. The system has been described as a bio-linguistic approach to linguistic development and correction. It is based fundamentally on the primary part played by neuro-muscular learning in the speech function.

Assuming no previous knowledge of phonetics or speech corrective principles on the part of the reader, Mrs. Young prefaces the explanation of her techniques with very comprehensive descriptions of the role of each part of the speech mechanism in the production of the vowels and consonants. In elaborating on her techniques, Mrs. Young constantly emphasizes the dynamic aspects of the system which combines kinesthetic learning with auditory and visual stimuli and mental hygiene when needed. The methods are applied to children while reclining on a specially designed table adjusted to an appropriate height for the therapist.

Speech sound sequences are introduced to the subject through skillful touching, pressing, or stroking of anatomical structures involved in the desired speech activity. A tongue depressor may be used to assist in the establishment of the appropriate kinesthetic sensations within the mouth. The skill required on the part of the teacher for the successful molding of the bodily parts into meaningful sound sequences is the result of rigorous practice, preferably under the careful supervision of an experienced moto-kinesthetic technician.

Mrs. Edna Hill Young does not follow the traditional idea that normal one, two, and three year olds need no assistance in speech development other than the ordinary stimulation which occurs in their environment. She feels that the moto-kinesthetic techniques can be applied even as early as seven months to prevent the child from developing incorrect speech habits as many do when left to their own devices. Numerous examples of the application of this system to infants are described in the book and it may surprise some readers to note the teaching of such a chronologically late sound as [l] to a child of eighteen months.

In the opinion of this reviewer, the greatest value of this system lies in its application to the blind and blind-deaf speech defectives and the cerebral palsied. For the deaf-blind, Mrs. Young recommends combining her system with the Tadoma techniques (the vibration method) for best results. For the cleft palate speech problem, the readers will find some valuable suggestions in this system for overcoming facial assymetry and grimaces.

In the chapter on stuttering, it is suggested that this condition may sometimes result from failure to establish correct articulatory habits. The individual is aware that he is not making a sound correctly but does not know how it should be made; hence, the instability in the speech function. Some authorities may disagree with this philosophy. However, Mrs. Young, as a therapist, has had considerable success with primary stutterers. She does state in this chapter too, that when a stutterer has reached the secondary stage of the disorder some type of psychological therapy is usually needed.

The second part of the volume, written by Dr. Sara Stinchfield Hawk, deals comprehensively with the changes in intelligence quotients obtained with speech improvement acquired through the moto-kinesthetic method. Using actual case histories as illustrative material, the study includes the analyses of physical examinations, mental tests, audiometer tests, performance tests, and speech tests. These experiments are carried into the area of the blind speech defective and the mentally deficient as well.

The book is generously illustrated with

*Book Reviews* is edited by Ernest H. Henrikson, University of Minnesota.

photographs of some of the manipulative techniques.

Although the application of these techniques to a variety of speech problems has been and probably always will be a controversial matter, there is too much of value in this system for it not to receive an important place in the education of speech therapists today. The moto-kinesthetic technique requires infinite patience, skills acquired only with untiring persistence, and an inspired devotion to a worthwhile ideal as exemplified by the two distinguished authors of the book.

MARY HUBER
*Los Angeles State College*

THOMAS, CHARLES K. *Handbook of Speech Improvement*. New York: Ronald Press Company, 1956. Pp. 135. $2.75.

This book, according to the author, is designed for those people whose speech lacks accuracy or distinctness, fails to give the impression of a good social background, or suggests the patterns of another language. It is essentially a drill manual of exercises for practicing correct articulation of English consonants, vowels, and diphthongs. The manner and place of production are described briefly for each sound. In addition, diagrams are employed to illustrate the place of production of each consonant. Sounds are identified by the symbols of the International Phonetic Alphabet. The exercises include (1) lists of paired words which provide opportunities for contrasting the sound to be practiced with others, (2) lists of words which contain the sound to be practiced in each position and in blends, and (3) sentences in which the sound to be practiced occurs frequently. Each sound is presented in a variety of phonemic contexts. The words of the drill material are, in general, simple and commonly used words. An index of sounds provides for easy reference to desired drill materials.

This handbook should be particularly helpful for work with foreign dialect because of (1) the simple vocabulary, (2) the simple and clear instructions and discussion, and (3) the exercises providing opportunities for contrasting sounds with others. Although more complete discussion of the production of speech sounds may be found in other publications, the presentation in this book and the drill material should be quite useful to the person directing his own therapy or to the person who needs ready-made exercises for practice outside the therapy session.

DOROTHY SHERMAN
*University of Iowa*

RUTHERFORD, BERNEICE *R. Give Them a Chance to Talk*. Minnesota: Burgess Publishing Co., 1956. Pp. 133. $3.25.

This is a revised edition of a book with the same title. The author has made some additions in this revision which are both useful and informative. Without specifically mentioning the term, she has emphasized the functions of members of the 'team,' describing the work of the pediatrician and that of the psychologist as well as the parent. The section on work with the very young child fills a very definite need; it might have been enlarged upon to good advantage. The author has included pictures and explanations of the use of the Rutherford instruments. In the hands of skilled speech therapists, this material will be useful. The discussions on adults with cerebral palsy and parent training add much to the value of this little book. A limited bibliography and list of references are appended. The book is a must for the library of the speech therapist. Its use by parents would depend entirely upon the capability of the individual parent. Users of this book will appreciate the improved binding of this edition which should make it much more serviceable than the earlier edition.

JULIETTE M. GRATKE
*United Cerebral Palsy Association*
*Dallas, Texas*

HELLER, MORRIS F., ANDERMAN, BERNARD M., and SINGER, ELLIS E. *Functional Otology: The Practice of Audiology*. New York: Springer Publishing Co., 1955. Pp. 209. $5.50.

This is a book devoted to an elementary discussion of a broad range of subjects in the field of audiology. The book is written principally by an otologist for other otologists. Its purpose is to show how the auditory functional examination and the educational rehabilitation of the acoustically handicapped patient can be integrated into otological practice.

Dr. Heller has contributed chapters on the Office Testing Area, Audiology Centers, Equipment, the Patient's History, Pure Tone Audiometry, Recruitment, Deafness of Non-organic Origin, Tuning Forks and Bars,

Tinnitus, and Infants and Children. Mr. Anderman has written the chapters on Voice and Speech Production, Speech Deviations in Conductive Deafness, Speech Deviations in Perceptive Deafness, and Auditory Rehabilitation.

For the most part, this book will serve to orient the otologist to the fundamentals involved in the field of audiology and expand his understanding of the contributions this specialty has made to the rehabilitation of hearing handicapped persons. Of particular value in this regard is the excellent chapter on hearing aids prepared by Mr. Anderman. This chapter discusses the carbon, vacuum tube, and transistor hearing aids. In addition, it describes such performance characteristics as frequency response, gain, distortion, and maximum power output. One of the sections of the chapter briefly details the techniques and procedures of hearing aid selection. At the least, this and the other chapters on rehabilitation will provide the otologist with increased understanding of the need and the value of the referral of patients to audiology centers.

The major portion of the book is devoted to a discussion of the important diagnostic assistance audiology has made available to the otologist. The subject of recruitment is treated in an easily understandable manner. The binaural alternate-loudness balance test, the monaural loudness contours, loudness judgment, and the difference limen are detailed. While Dr. Heller provides only a basic discussion of these tests, he presents a brief description of the testing procedure which should eliminate a good deal of confusion as well as stimulate many otologists to attempt these procedures in their offices.

The chapter on nonorganic deafness shows considerable insight into the problems associated with examining the patient with this type of disability. Dr. Heller has had extensive experience in this area. While he describes certain simple procedures which may be used to establish the diagnosis, he makes it clear that an imaginative approach to these cases is essential and that clues may be uncovered as readily through the interview and observation sessions as through the various audiometric procedures. The chapter makes no serious attempt to present a description of the classic tests for nonorganic deafness or their procedures.

The authors state that developments in audio-communication, investigations about high intensity noise, modern practices by school and health departments, and researches into the multifaceted area of hearing are changing the practice of otology. They point out that the physician now must be able to evaluate the ear pathology as well as the impairment of hearing which is the result of the pathology.

'The ultimate purpose of this book,' state the authors, 'is to aid the physician and others participating in the field of functional otology in determining the rehabilitative requirements of the patient, how they shall be met, and who will institute the program of rehabilitation.' This is an ambitious undertaking which many may doubt is satisfied entirely by this little book. But what basic materials and brief discussion are presented are presented well. If they serve only to arouse the interest of the otologist in the field of audiology, the book will have made a significant contribution. An excellent selected bibliography is available at the end of the book for those otologists whose interest has been stimulated to further reading.

KENNETH O. JOHNSON
*Veterans Administration*
*Washington, D. C.*

DI CARLO, LOUIS M., AMSTER, WALTER W., and HERER, GILBERT R. *Speech After Laryngectomy. A Comparative Study of the Breathing and Speech Coordinations of Laryngectomized and Normal Subjects, and the Relationships Between the Breathing and Speech Coordinations and Articulatory Errors of Laryngectomized Subjects to their Speech Intelligibility*. New York: Syracuse University Press, 1955. Pp. 184. $4.00.

This was an expensive monograph to publish because of the 70 photographs and distribution charts and 57 tables of statistics in 184 pages. The authors present a thorough history of the theories and methods of teaching esophageal speech and physiological research by surgeons and phoneticians. Their review points up three controversies: (1) the association or dissociation of respiratory and phonatory processes during speech after laryngectomy, (2) the location of the vicarious air chamber, and (3) the site of the pseudo-glottis. The authors direct their goal to confirming and expanding the previous studies on silent and speech-breathing movements of laryngectomized speakers compared with normal speakers: on factors making up intelligibility of esophageal speech, on the relation of articulatory errors

to intelligibility, and on correlations of their findings with cinefluoroscopic film views. Rather elaborate equipment was used to make kymograph recordings of breathing movements, and chest, mouth and tracheal pressures. Tape recordings of phrases, sentences, paragraphs, PB word lists and multiple choice word tests were evaluated by trained and untrained speech specialists. These were given elaborate and detailed statistical treatment.

Laryngectomees were found to differ from normal speakers in silent breathing, both in cycles per minute and amplitude of chest movement, but showed similarity in configuration. They exceeded normal speakers in total speaking time and in number of phrases employed. Good esophageal speakers had less inaccuracies than poor esophageal speakers in the word and sentence tests; both groups had more inaccuracies than normal speakers. Esophageal speakers produced correctly 78.8% of the consonants and 80.7% of the vowels. This almost equal ratio was quite different from the Hyman and Anderson studies which showed the vowels had a ratio of 6 to 4 over consonants. The vowels ranked fifth in accuracy of production contrasted with first place in the Hyman and Anderson studies. Where normal speakers produced five-, seven-, and nine-syllable phrases in one breath impulse, the esophageal speakers used two-, three- and four-syllable phrases respectively. Rhythm in sentences proved an excellent indicator of inadequacy of esophageal speech; only 54% of the sentences were spoken with normal rhythm, 37% with abnormal rhythm, and the balance without rhythm. Intelligibility correlated highly with normal rhythm.

The cinefluorographic film views indicated that the synchronous aspects of respiration during speech of the high-intelligibility group more closely resembled normal speakers than the low group. There was a close coordination of air intake in the mouth and inspiratory phases of the abdomen and thorax which broke down in poor speakers. The upper third of the esophagus was used as the air chamber by good speakers whereas the poor speakers filled the lower part of the esophagus. Abdominal movement was more closely associated with poor speech. The pseudo-glottis was at the area of the cricopharyngeal muscle among good speakers; it occupied a larger area extending downward into the esophagus among poor speakers.

The evidence from their research leads the authors to propose certain technics as the most efficient for teaching and initiating speech after laryngectomy. They suggest that a pre-speech training period be directed to synchronize speech-breathing with voice control, rhythm, and phrasing prior to communicative speech, in order to effect a closer association of respiratory and phonatory processes.

These researches do not appear to have solved or resolved all the questionable and unknown factors in speech after laryngectomy. The findings concerning vowel and consonant errors would seem to contradict everyday listening to laryngectomees' speech. This listening experience has indicated that vowels are easily discerned, but errors in consonants may make esophageal speech unintelligible.

Apparently, 15 cases were not enough for final and definite conclusions. This would appear to be especially true of the authors' findings that the factors of different types and degrees of radical surgery had 'no differentiating tendencies for high and low intelligibility of speech.' The experience of teachers shows that the more severe and radical surgical patients have much greater difficulty talking than those with simple laryngectomy. It would have been wise to have included studies of some of the many cases who never learned to talk. Furthermore, a longitudinal study might have found finer coordinations among the matured speakers and poorer coordinations among those who were struggling to acquire speech. As Dr. Julius W. McCall states in his foreword, the general purpose of the research was achieved and should serve, with Hyman and Anderson studies, as a rationale and framework for further research to effect a more systematic method of teaching speech to laryngectomized persons.

WARREN H. GARDNER
*Cleveland Clinic*

## Errata

Book Review of *Parents and Children: A First Book on the Psychology of Child Development and Training* by C. W. Valentine in March 1956 issue.

In the third paragraph, change 'experimental' to 'experimental'. In the fifth paragraph, change 'late 1930 and early 1940' to 'the late 1930's and early 1940's'.

# Abstracts

### Absolute Threshold

WHITE, C. E. How loud is silence? *Audio-Engin.*, 40(3), 1956, 17-19.

This paper deals with the problem of the theoretical determination of the absolute threshold of the ear. Special note is made of the fact that this sensitivity level of the ear is limited by the noise level present in the ear itself.

(*C. N. Hanley*)

### Aphasia

FITCH, D. B. The emotional effects of traumatic aphasia. *Speech*, 19, 1955, 24-26.

The distress of a patient shortly after developing aphasia is reported from his own written account.

(*A. J. Berlin*)

GOTTSLEBEN, R. H. Pseudo-mental deficiency resulting from childhood aphasia. *Train. Sch. Bull.*, 52, 1956, 239-249.

A case study of aphasia with an overlay of reduced hearing acuity is presented. The author discusses the differential diagnosis and the speech program, and evaluates the results of the speech therapy.

(*B. B. Schlanger*)

HEILBRUN, A. B., JR. Psychological test performance as a function of lateral localization of cerebral lesion. *J. comp. physiol. Psychol.*, 49, 1956, 10-14.

One hundred right-handed subjects, including 24 subjects with left hemisphere lesions and mild aphasic symptoms, 15 subjects with right hemisphere lesions, 20 subjects with bilateral lesions, and 29 subjects without brain injury or disease, were given a battery of 15 tests with verbal and spatial categories. Results of the study are said to support the hypothesis that right-handed subjects with left hemisphere lesions show inferior performance on verbal tasks. The findings also are said to suggest that this poor performance is largely related to the aphasic factors.

(*I. E. Hegarty*)

KLEIN, R. and HARPER, J. The problem of agnosia in the light of a case of pure word deafness. *J. ment. Sci.*, 102, 1956, 112-120.

The findings during 18 months of observation of a case of severe word deafness are reported, and the mechanism of the disorder is discussed.

(*A. J. Berlin*)

SKLAR, M. and BENNETT, D. N. Initial communication chart for aphasics. *J. Ass. Phys. ment. Rehab.*, 10, 1956, 43, 53.

The authors present and evaluate a word-picture chart for use with hospitalized aphasic patients. The chart, containing 18 pictures and words, is said to be particularly useful with expressive aphasics in making functional needs known with reduced frustration.

(*V. B. Carroll*)

### Artificial Larynx

LUEDERS, O. W. Use of the electrolarynx in speech rehabilitation. *Arch. Otolaryng.*, 63, 1956, 133-134.

*Abstracts* is edited by William R. Tiffany, University of Washington, assisted by the following committee: Asa J. Berlin, Pennsylvania State University; Virginia B. Carroll, Minneapolis Veterans Hospital; Frederic L. Darley, State University of Iowa; Clair N. Hanley, University of Washington; Inez E. Hegarty, Mt. Holyoke College; John J. O'Neill, Ohio State University; John M. Palmer, University of Washington; Maryjane Rees, Sacramento State College; Frank B. Robinson, Miami University; Vivian I. Roe, University of Indiana; Bernard B. Schlanger, Vineland (N.J.) Training School; George H. Shames, University of Pittsburgh; Joseph G. Sheehan, University of California; Barbara S. Street, Minneapolis Veterans Hospital; Wayne L. Thurman, Eastern Illinois State Teachers College.

### Atresia

SUMMONS, M. W. and FUSON, T. J. Atresia of the external ear canal. *Arch. Otolaryng.*, 63, 1956, 128-132.

The authors review the history, etiology, and surgical treatment of congenital and acquired aplasia or atresia of the external ear.

(*J. M. Palmer*)

### Audiometry

HARRIS, J. D., HAINES, H. L. and MYERS, C. K. A new formula for using the audiogram to predict speech hearing loss. *Arch. Otolaryng.*, 63, 1956, 158-176.

The authors review the theoretical and practical bases of several systems for predicting a hearing loss for speech, and propose a new system based upon the multiple regression prediction equation. The proposed system predicts for special cases somewhat better than others, but it is not superior to any other system for all types of hearing loss cases. A table for computing speech losses from pure tone audiograms based upon the proposed system is presented.

(*J. M. Palmer*)

### Auditory Distraction

BUTLER, R. A. and HARLOW, H. F. The effects of auditory distraction on the performance of monkeys. *J. gen. Psychol.*, 54, 1956, 15-20.

### Behavior Disorders

PASAMANICK, B., ROGERS, M. E. and LILIENFELD, A. M. Pregnancy experience and the development of behavior disorder in children. *Amer. J. Psychiat.* 112, 1956, 613-618.

The possibility of brain injury being etiologic in childhood behavior disorders was investigated by a study of all persons born in Baltimore after 1939 who had been referred for behavior disorders to the Division of Special Services of the Department of Education. Results are reported to show that the prenatal and paranatal records of children with behavior disorders show significantly more prematurity and complications of pregnancy than their matched controls. The non-mechanical abnormalities such as toxemia appear to be more important factors than mechanical factors of delivery. Hyperactive, confused and disorganized children have even more abnormalities in their background. The authors hypothesize a gradient of injury extending from fetal and neonatal death through cerebral palsy, epilepsy, mental deficiency and behavior disorders.

(*B. S. Street*)

### Binaural Hearing

BERGMAN, M. Binaural hearing means better hearing. *Hearing Dealer*, 6(2), 1956, 10-12.

The author discusses the advantages of binaural hearing over monaural hearing. These advantages are described as: (1) localization, (2) discriminative selection, (3) speech sound discrimination, (4) ease of listening, (5) sound identification, and (6) improved sound quality. The author suggests that the development of binaural hearing aid glasses may allow for adequate two-eared hearing.

(*J. J. O'Neill*)

### Birth Injury

JOLLY, H. Birth injuries. *Practitioner*, 176, 1956, 369-377.

JONES, H. E. Asphyxia neonatorum. *Practitioner*, 176, 1956, 360-368.

### Brain Injury

BUCHANAN, J. J. Rapid mobilization of cerebrovascular accident patients. *Arch. phys. Med.*, 37, 1956, 150-151.

In order to investigate the factors involved in an early return to activity on the part of cerebrovascular patients, 234 cases were studied. These patients were started on an active physical medicine treatment program within one week after their cerebrovascular accident. Eighty-eight per cent were able to ambulate independently 30.7 days (average) later. 'Other, unmeasurable results observed were more rapid and complete clearing of the sensorium, better recovery of speech, more rapid and complete return of normal personality and drives, and a high degree of cooperation with the treatment program. There were no instances of a second CVA in these patients while undergoing the program.'

(*F. L. Darley*)

MEYER, J. S. Studies of cerebral circulation in brain injury. III—Cerebral contusion, laceration, and brain stem injury. *Electroenceph. clin. Neurophysiol.*, 7, 1956, 107-116.

Findings are reported from studies of the effects of 22 contusions, 12 lacerations, 3 fatal brain stem injuries, and 2 penetrating wounds on rhesus monkeys and cats.

(*V. B. Carroll*)

## Cerebral Palsy

BAKER, L. D. A rational approach to the surgical needs of the cerebral palsy patient. *J. Bone Jt. Surg.*, 38-A, 1956, 313-323.

The author discusses the position that 'rehabilitation of the patient with cerebral palsy, as in all neuromuscular problems, depends upon the restoration of muscle balance, the proper alignment of joints, and the establishment of correct posture with normal relationship to the line of gravity.' He concludes: 'Whenever uncontrolled spasticity or tension interferes with realizing these goals, one should not be reluctant to carry out necessary, properly selected surgery.' Specific surgical procedures are described and the results of 590 operative procedures are presented.

(*F. L. Darley*)

HIPPS, H. E. Basic teaching-training principles for the patient with cerebral palsy. (Editorial). *Amer. J. Surg.*, 91, 1956, 715-718.

The author presents and develops ten 'fundamental concepts of teaching and training.'

(*F. L. Darley*)

KELEMAN, G. Erythroblastosis fetalis. *Arch. Otolaryng.*, 63, 1956, 392-398.

KIRMAN, B. H. Epilepsy and cerebral palsy. *Arch. Dis. Childh.*, 31, 1956, 1-7.

Statistics are reported for 228 cases of cerebral palsy and 265 cases of epilepsy recorded over a five year period.

(*F. L. Darley*)

PHELPS, W. M. Classification of athetosis with specific reference to the motor classification. *Amer. J. phys. Med.*, 35, 1956, 24-31.

A motor classification of 12 readily identifiable types of athetosis is presented. The author reports that he has found it possible to place all cases of athetosis he has seen in one of the 12 groups. 'Use of fewer groups would cause confusion in general classification . . . Classification is always made by the most outstanding characteristics of the total picture.'

(*F. L. Darley*)

## Cleft Palate

PRUZANSKY, S. Factors determining arch forms in clefts of the lip and palate. *Amer. J. Orthodon.*, 41, 1955, 827-851.

The author describes the factors which determine the palatal and dental arch forms in various types of clefts of the lip and palate. 'It was demonstrated that the lateral construction of the maxillary arch common to patients with cleft lip and palate could not be attributed in all instances to a growth arrest incurred through surgical damage.' Selected cases are presented to illustrate the method used to reduce the asymmetries in arch forms through orthodontic means. A plea for early orthodontic therapy for the preschool child is entered on the basis that such therapy provides for more favorable growth and development, reduces the susceptibility to dental caries and disease, and is prerequisite to the development of articulate speech, proper mastication, and proper nasal ventilation. Seventeen figures of dental casts are used to illustrate the case discussions.

(*W. R. Tiffany*)

RICKETTS, R. M. Present status of knowledge concerning the cleft palate child. *Angle Orthodont.*, 26, 1956, 10-21.

This paper is presented as a relatively systematic review of the incidence, etiologies, and types of maxillo-facial congenital defects. The author points up the current trends in treatment and calls for the 'team' approach for maximum rehabilitative results.

(*C. N. Hanley*)

SUBTELNY, J. D. Width of nasopharynx and related anatomic structures in normal and unoperated cleft palate children. *Amer. J. Orthodon.*, 41, 1955, 889-909.

This study compares the anatomic structures of 51 non-cleft palate cases and 91 unoperated cleft cases. 'Laminagraphy, a body-sectioning radiographic technique, was utilized in this study to evaluate objectively the lateral dimensions of the osseous nasopharyngeal and related areas.' The author finds wider nasopharyngeal dimensions in the cleft types than in the normal subjects. Differences in angular inclination of the pterygoid plates are also reported.

(*G. H. Shames*)

ZWENIER, T. J. An electromyographic study of the temporal and masseter muscles in cleft palate patients with insufficient maxillary development. *Angle Orthodont.*, 25, 1955, 99-112.

### Concept Formation

UNDERWOOD, B. J. and RICHARDSON, J. Some verbal materials for the study of concept formation. *Psychol. Bull.*, 53, 1956, 84-95.

The authors present results of their attempt to develop materials for use in the study of verbal concept formation.

(*B. S. Street*)

### Cortical Hearing

KIMURA, R. S., SCHUKNECHT, H. F., and SUTTON, S. Effects of cochlear lesions on the threshold responses of the auditory cortex in chronic experiments. *J. comp. physiol. Psychol.*, 49, 1956, 96-104.

Cortical thresholds for pure-tone stimuli were determined for eleven cats before and after experimentally produced hearing losses. Histological studies were made of each cochlea. The findings support the concept of an ordered frequency distribution within the cochlea with high frequencies at the base and low frequencies at the apex.

(*I. E. Hegarty*)

TUNTURI, A. R. Masking of cortical responses in middle ectosylvian auditory area of the dog. *Amer. J. Phys.*, 184(2), 1956, 321-328.

### Crippled Children

STITT, P. G. and BURKE, B. S. Nutrition services for crippled children. *Children*, 3, 1956, 55-60.

The role of the nutritionist in the overall health supervision of crippled children is presented in detail.

(*B. B. Schlanger*)

### Deaf Child

FANJOY, R. W. The future of the deaf child. *Canad. Med. Ass. J.*, 74, 1956, 533-538.

Typical problems in the differential diagnosis of deafness are discussed.

(*F. L. Darley*)

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### Delayed Sidetone

EWERTSEN, H. W. Delayed speech feedback. *Acta Otolaryng.*, 45, 1955, 383-387.

This paper reports the author's technique in the utilization of delayed speech feedback for the detection of non-organic hearing impairments. The author suggests the use of a delay time of .25 second. Recitation of memorized materials, especially poems, is suggested as the stimulus. The author believes the feedback is more disturbing with this technique, as the subject does not have the advantage of the text before him to help him concentrate upon his speech pattern. The author concludes that when speech disturbance occurs at a sensation level of 50 db hearing may be normal; at 80 db, hearing loss is about 40-50 db; and at 100 db, hearing loss is about 70 db. Out of 100 normal hearing volunteers reported by the author only one is said to have remained perfectly unaffected at a feedback level of 100 db. There was no apparent adaptation to the disturbing effect of the sidetone after several weeks of practice. Several illustrative case reports are included.

(*C. N. Hanley*)

### Fenestration

HARBERT, F. Some aspects of fenestration. *Arch. Otolaryng.*, 63, 1956, 347-350.

### Fricative Consonants

HUGHES, G. W. and HALLE, M. Spectral properties of fricative consonants. *J. acoust. Soc. Amer.*, 28, 1956, 303-310.

'Energy density spectra of gated segments of fricative consonants were measured. The spectral data were used as a basis for developing objective identification criteria which yielded fair results when tested. As a

further check gated segments of fricatives were presented for identification to a group of listeners and their responses evaluated in terms of the objective identification criteria.'

(*Author's precis*)

### Hearing Aids

A new test of transistor hearing aids. *Consum. res. Bull.*, 37(5), 1956, 24-26.

This is a report and an evaluation of the physical characteristics of 15 standard transistor hearing aids.

(*C. N. Hanley*)

Transistor hearing aids. *Consum. res. Bull.*, 35(5), 1955, 10-18.

The response, distortion, noise, controls and 'fitting' of transistor hearing aids are discussed. Twenty transistor hearing aids were examined and evaluated.

(*W. L. Thurman*)

### Hearing Theories

WHITE, C. E. How do we hear? *Audio-Engin.*, 39(9), 1955, 20-21.

This article is in the form of a brief resume of the more noteworthy theories of hearing.

(*C. N. Hanley*)

### Hemispherectomy

GARDNER, W. J., KARNOSH, L. J., MCCLURE, L. C. and GARDNER, A. K. Residual function following hemispherectomy for tumour and for infantile hemiplegia. *Brain*, 78, 1955, 487-502.

Accounts of the post-operative functioning of ten patients who had a cerebral hemispherectomy as a result of a glioma were studied and compared with post-operative accounts of patients who had a hemispherectomy as a result of infantile hemiplegia associated with incontrollable convulsions, athetosis, tantrums and mental deficiency. The authors conclude that if one hemisphere is impaired by developmental anomaly, birth trauma, or disease process shortly after birth, other parts of the brain do, to some extent, acquire the function which would otherwise be performed by the parts that have failed to develop. In the adult nervous system, where physiological centers and pathways have already been laid down, other areas cannot 'take over' the function of parts destroyed.

(*B. S. Street*)

### Hereditary Deafness

GETZ, S. B. The factor of hereditary deafness in auditory training. *Acta Otolaryng.*, 45, 1955, 395-397.

On the basis of an examination of 21 audiograms from hereditarily deaf children the author concludes that there is no typical audiometric curve for hereditary deafness. Thus, it is said that knowledge that a child's deafness is probably of hereditary origin is not of predictive value in the determination of the promise of auditory training.

(*J. J. O'Neill*)

### Infancy

CRAIG, J. and CLARK, N. S. The physiology of the first year of life. *Practitioner*, 176, 1956, 343-351.

### Infant Speech Development

MARLAND, P. M. Diary of the speech and motor development of an infant from birth to one year. *Speech*, 19, 1955, 36-59.

### Intelligence Tests

GEHMAN, I. H. and MATYAS, R. P. Stability of the WISC and Binet tests. *J. consult. Psychol.*, 20, 1956, 150-154.

Binet and WISC (Wechsler Intelligence Scale for Children) tests were given to 60 boys and girls in fifth grade and four years later in ninth grade. Both tests yielded IQ's that were relatively constant and showed equal stability as determined by comparison between mean scores, test-retest for correlations, and intercorrelations of major parts. On the average it required 13 minutes less at both grade levels to give a full WISC than to give a Binet.

(*B. S. Street*)

### Intelligibility

MOSER, H., DREHER, J., and ADLER, S. Effect of vocal inflection on the intelligibility of two-unit signals. AFCRC TN 55-59, RF Project 519, Tech. Report 23, March, 1955, Ohio State University Research Foundation.

This is a report of a study designed to determine the relative influence of nine basic

vocal inflectional (pitch) patterns on the intelligibility of two sequential signals. A total of 70 undergraduate college students listened to the following types of two-unit signals varied with regard to the nine inflectional patterns: (1) intoned vowel pairs, (2) two-digit numbers, (3) ICAO (International Civil Aviation Organization) alphabet word pairs, and (4) digit-word pairs. The experimental stimuli were recorded by two male talkers representative of General American and Eastern speech.

Responses of the subjects at –9, –12, and –15db S/N ratios indicate that (1) the rank order effectiveness of the nine contour sequences differ somewhat with the type of signal, (2) generally speaking, flat-flat and rising-rising inflections are best with all types of two-unit signals, (3) a 'mirror image' effect was noted with all signals, and (4) the intensity of a contour is unaffected by its tonal environment.

(*F. Robinson*)

Moser, H., Dreher, J., and Adler, S. The effects of controlled affective tone on intelligibility. AFCRC TN 55-59, RF Project 519, Tech. Report 24, June, 1955, Ohio State University Research Foundation.

Four professional actors recorded a random selection of two-digit numbers conveying four different types of controlled emotion: anger, fear, sadness, and unemotionality. This stimulus material was written as heard by 39 R.O.T.C. students in a free field situation at an approximate –3db S/N ratio. Articulation scores obtained for each of the emotions indicated that the overlay of controlled emotion added nothing to intelligibility.

(*F. Robinson*)

Moser, H. M., Dreher, J. J., and Adler, S. The effects of controlled bounce block and prolonged block on the intelligibility of operational words. AFCRC TN 55-61, RF Project 519, Tech. Report 26, June, 1955, Ohio State University Research Foundation.

Six lists constituting different randomizations of 50 PB words were tape recorded by a trained speaker of General American dialect using three methods of presentation —normal, bounce block, and prolonged block. Three separate groups of listeners, one group for each method, wrote responses to the recorded words which were presented in the presence of recorded white noise under S/N ratio conditions of +4, 0, and –4 db.

The mean intelligibility scores in per cent correct for all noise conditions were: bounce block, 73.8%; normal, 63.0%; and prolonged block, 45.9%. The bounce block was superior to the prolonged block in all noise conditions but was superior to normal delivery only in the most severe noise conditions. The authors conclude that transmission of PB words under unfavorable reception conditions is materially aided by the use of the bounce block.

(*M. Rees*)

Moser, H. M., Dreher, J. J., and Adler, S. Position and weather telling methods. AFCRC TN 55-62, RF Project 519, Tech. Report 27, July, 1955, Ohio State University Research Foundation.

Moser, H., Dreher, J., and Oyer, H. Four digit number telling methods. AFCRC TR 54-86, RF Project 519, Tech. Report 16, Sept., 1954, Ohio State University Research Foundation.

A two-part study was conducted to determine the relative intelligibility of four types of four digit numbers. The types used were: (a) single digit (one-two-three-four), (b) group (twelve thirty-four), (c) mixed (one, two-thirty-four), and (d) full word (one thousand two hundred thirty-four). In the first phase of the study, American and foreign subjects heard samples of the four-digit numbers recorded in General American speech. In the second phase, the stimulus material was recorded by six international speakers. The subjects heard the tests at 0db, –3db, –6db, –9db, and –12db S/N ratio.

American listeners handled all types equally well when either Americans or foreigners were speaking. Foreign subjects, listening to Americans, did best with the single-digit method, worst with the full-word type. When listening to an international speaker panel, foreign listeners exhibited no differences with the single digit, group, or mixed types, but again scored lowest with the full-word form.

(*F. Robinson*)

Thwing, E. J. Effect of repetition on articulation scores for PB words. *J. acoust. Soc. Amer.*, 28, 1956, 302-303.

In order to study the effect of word

repetition on articulation scores, three groups (10 in each group) of naive listeners were administered PB tests under four conditions of repetition: one, two, three and four repetitions of each stimulus word. The three groups were each assigned to a different (+ 4 db, + 10 db, + 16 db) signal-to-noise ratio condition. The author concludes that repetition of the stimulus item raises the articulation score, but only to a slight extent, and that this increase occurs primarily for the second presentation. The third and fourth repetitions are said to have only a negligible effect.

(*C. N. Hanley*)

### Intra-aural Muscles

Bornschein, H. and Krejci, F. Bioelectrical analysis of the function of the intra-aural musculature. Translations of the Beltone Institute for Hearing Research, No. 2, 1956, from Bioelektrische funktionsanalyse der intraaural-muskulatur, *Mschr. Ohrenheilk.*, 26, 1952, 221-229.

Electromyograms of reflex contractions of the tensor tympani muscles of 12 non-narcotized rabbits showed that: (1) muscle activity is dependent on the intensity of the stimulus, permitting the assumption of a relatively large number of motor units; (2) the frequency of impulses of a unit is about 15 per second with weak stimulation; (3) the latency time between cochlear and muscle action potentials is 12 to 13 msec; (4) detonations of limited intensity produce activity with a 12 to 13 msec. latency time, very short duration, and considerable synchronization of numerous units; (5) activity decreases rapidly after a few seconds of continuing stimulation of high intensity.

Between 2000 and 4000 cps the hysteresis effect of the cochlear potential is not appreciably altered by sectioning of the tensor tympani muscle. However, hysteresis is abolished by curarization both with intact and sectioned tensor tympani muscles. The authors conclude that the stapedius muscle is primarily participating in the origin of the hysteresis effects. The results are discussed in relation to other investigations of intra-aural muscular functioning.

(*M. Rees*)

Wever, E. G. and Vernon, J. A. The effects of the tympanic muscle reflexes upon sound transmission. *Acta Otolaryng.*, 45, 1955, 433-439.

'Experiments were carried out on the cat to show the changes in sound transmission by the ear caused by a reflex contraction of the tensor tympani and stapedius muscles, acting both jointly and individually. The reflex action was elicited by tonal stimulation of the opposite ear.

'For excitation a little above threshold, the most striking effect is a reduction in the transmission of low tones. This effect diminishes as the frequency is raised and disappears around 600 cycles. It then becomes an enhancement for a narrow region between 600 and 1000 cycles. For the higher frequencies the tensor tympani muscle produces a moderate reduction in transmission, whereas the stapedius muscle has only slight affects.

'When the acoustic stimulation is made stronger the muscle action becomes more vigorous and the transmission undergoes progressively greater changes. For the low tones the reductions of transmission keep pace with the stimulation for a considerable range of intensity so that there is a check on the magnitude of stimulation reaching the inner ear. The sensory structures of the cochlea are thus protected against damage, until finally a limit of the muscular action is reached. In some cases the regulatory effect may be as great as 20 db for the lower tones.'

(*Author's precis*)

### Laryngeal Cancer

Barosa, J. F. Radical laryngectomy with bilateral neck dissection in continuity. *Arch. Otolaryng.*, 63, 1956, 372-383.

Wydner, E. and Bross, I. Epidemiological approach to the etiology of cancer of the larynx. *J. Amer. med. Ass.*, 160, 1956, 1384-1391.

Two hundred nine American males and 138 males of India, all of whom had cancer of the larynx, were given a common questionnaire by interview. The results were studied with respect to tobacco use, alcohol use, voice strain, and other possible etiological factors.

(*W. L. Thurman*)

### Linguistics

Moncur, J. P. A comparative analysis of [u-u] variants in the San Francisco and Los

Angeles areas. *Quart. J. Speech*, 42, 1956, 31-34.

PRIOCH, G. The importance of bilingual description to foreign language learning. *Language Learning*, 6, 1955, 51-62.

A summary of the work of Weinreich and Hougen in devising methods of setting up bilingual descriptions is presented. A system for presenting phonemic analyses of languages is shown. Comparisons of English and Slovak are used to illustrate the system.

(*F. Robinson*)

**Mastoiditis**

MORSE, H. R. Intracranial complications of chronic mastoiditis. *Arch. Otolaryng.*, 63, 1956, 142-145.

The author discusses six complications of chronic mastoiditis: facial nerve paralysis, labyrinthitis, petrositis, lateral sinus thrombosis, brain abcess, and meningitis. Case reports are presented.

(*J. M. Palmer*)

**Malocclusions**

HANLEY, C. N. and SUPERNAW, E. W. A study of the incidence of defective speech in cases of open-bite malocclusion. *West. Speech*, 20, 1956, 23-28.

Twenty-five children between the ages of 9 and 18 years were examined by an orthodontist who determined degree of open-bite by measuring the distance from the incisal edge of the most erupted mandibular incisor to its potentially opposing structure. Distances ranged from 1.8 to 10.0 millimeters. Twelve of the children had Class I malocclusions while 13 had Class II, division 1, malocclusions. A speech therapist determined speech to be normal in eight cases, acoustically acceptable but with compensatory articulation in eight cases, and defective in nine cases. The only defective sounds were [s], [z], [ʃ], [tʃ], [ʒ], and [dʒ].

Biserial correlation coefficients were nonsignificant for (1) normal speech and degree of open-bite, (2) compensatory speech and degree of open-bite, (3) defective speech and degree of open-bite. The tetrachoric correlation between antero-posterior jaw relationship and speech errors was nonsignificant. Analysis of variance indicated no difference in degree of open-bite among children with normal, defective, and compensatory articulation.

(*M. Rees*)

**Meniere's Disease**

GOODYEAR, H. M. Meniere's disease. *Arch. Otolaryng.*, 63, 1956, 343-346.

**Mental Defect and Deafness**

DAWSON, M. E. EVANS, M. J., REED, M. and MINSKI, L. An investigation into children in an attempt to differentiate between mental defect and deafness. *J. ment. Sci.*, 102, 1956, 121-128.

This is a report of the methods and the findings of the Belmont Hospital (England) in a study of 22 children who do not speak. The majority were between four and eight years of age. Educational and mental abilities were evaluated by observation and nonlanguage test batteries. Hearing was tested by a variety of methods including electroencephalography and psychogalvanic reflex. The problems of this type of testing as well as deciding on future placement for the children are discussed.

(*A. J. Berlin*)

**Mental Retardation**

KASTEIN, S. The responsibility of the speech pathologist to the retarded child. *Amer. J. ment. Def.*, 60, 1956, 750-754.

The author discusses the responsibilities and contributions of the speech pathologist to the training of the retarded child. It is stated that differential diagnostic evaluations of the delay in language and speech development plus early language training may help the retarded child develop more rapidly and more completely in all areas.

(*B. B. Schlanger*)

LUBMAN, C. G. Speech program for severely retarted children. *Amer. J. ment. Def.*, 60, 1955, 297-300.

Ninety-three mentally deficient children with I.Q.'s below 50 received speech therapy once weekly in a community school program. Classroom teachers, following instruction, carried on the remainder of the week. Progress was reported in 62 of the children after five months of therapy.

(*B. B. Schlanger*)

MECHAM, M. J. The development and application of procedures for measuring speech improvement in mentally defective children. *Amer. J. ment. Def.*, 60, 1955, 301-306.

Tests of articulation, auditory memory span, auditory discrimination and oral language development were given to three groups of mentally defective children before and after eight weeks of speech therapy. The results are reported to imply that: (1) all but the oral language development tests were sufficiently reliable for use with mentally defective children; (2) significant improvement as a consequence of speech therapy was indicated by most of the tests; and (3) this improvement was independent of IQ, although the improvement in auditory discrimination was not independent of chronological age.

(*B. B. Schlanger*)

**Middle Ear Lesions**

KOBRAK, H. G. Pathology and audiology of middle ear lesions. *Arch. Otolaryng.*, 63, 1956, 177-182.

An approach to the diagnosis of post-inflammatory middle ear lesions is presented. The techniques included eardrum photographs, vibratory pattern study, acoustic probes, artificial eardrums, window-niche prostheses, and Politzer maneuver and Gelle maneuver.

(*J. M. Palmer*)

**Neuron Denervation**

HINES, H. M. and THOMSON, J. D. Changes in muscle and nerve following motor neuron denervation. *Amer. J. phys. Med.*, 35, 1956, 35-57.

**Noise**

BENNETT, W. R., Characteristics and origins of noise—part I. *Electronics*, 29(3), 1956, 154-160.

This first-in-a-series article describes the nature, production, and uses of various noise signals. The author also discusses techniques of noise reduction and/or control.

(*C. N. Hanley*)

BENNETT, W. R. Equipment for generating noise—part II. *Electronics*, 29(4), 1956, 134-137.

This is the second article in a series on noise. It deals specifically with the development of noise sources in the testing of receiving systems and their components. Performance and frequency characteristics of hot cathode arcs in gas-discharge tubes, photoelectron multipliers, nose diodes, and glow-discharge noise sources are discussed.

(*C. N. Hanley*)

**Occupational Deafness**

BERNABEI, L. On occupational deafness from white noise. Translations of the Beltone Institute for Hearing Research, No. 1, 1955, from Sulla sordità professionale da rumore bianco. *Rev. Audio. Prat.* (Milan) 3, 1953, 21-52.

The author studied the injury caused to the human ear by the very high levels of noise, of fairly uniform spectrum, produced by the borax wells of Tuscany. Audiometric and otorhinolaryngological examinations were made on groups of workers, some of whom had experienced noise intensity levels up to 140 db. On the basis of these examinations, the author considers 'the possibility of differentiating clinically two pictures of deafness that are related to different pathogenetic moments.' The first of these types is 'apoplectic deafness' and is said to be characterized by a sudden, painful trauma and irreversible loss. The second is 'a slowly evolving deafness' of slower and more insidious onset, where the critical factor is the length of time of exposure. Suggestions for prophylaxis are made with regard to ear protection, rest periods, otological control of personnel, and the use of tests of auditory fatigue.

**Orthodontia**

BARNETT, F. A. A rationale for closer cooperation between the orthodontist and the speech and hearing therapists. *Amer. J. Orthodon.*, 41, 1955, 571-582.

This paper cites the importance of interdisciplinary cooperation in cases in which dental anomalies and speech disfunction are intimately related. The author discusses this need for cooperation in cases of dental malocclusion, cleft palate, and cerebral palsy.

(*C. N. Hanley*)

### Otitis Media

MORTIMER, E. A. JR. and WATTERSON, R. L. JR. A bacteriologic investigation of otitis media in infancy. *Pediatrics*, 17, 1956, 359-367.

Clinical and bacteriologic data from 104 infants less than two years of age are presented. The data are said to indicate that pneumococci and H. influenzae are the chief bacterial causes of otitis media in infancy.

(*B. B. Schlanger*)

### Palate Movements

CALNAN, J. S. Movements of the soft palate. *Speech*, 19, 1955, 14-20.

Velar movement during speech and deglutition was studied in a patient with a cheek defect by direct observation and radiographs. Photographs and drawings are included. The value of radiographic examination for diagnosis and prognosis is discussed.

(*A. J. Berlin*)

### Pitch Discrimination

BUTLER, R. A. and ALBRITE, J. P. The pitch-discrimination function of the pathologic ear. *Arch. Otolaryng.*, 63, 1956, 411-418.

'Pitch difference limens for patients with perceptive hearing loss and those with conductive hearing loss were measured at 500, 1000, 2000, 3000, and 4000 cps. The performance of the perceptively deafened group was significantly inferior to that of the conductive group at 3000 and 4000 cps. Extensive training served to reduce the magnitude and group variability of the difference limens, but significant differences between groups remained. These data were interpreted in accordance with a modified "place theory of hearing".'

(*Authors' precis*)

### Pregnancy and Speech Disorders

PASAMANICK, B., CONSTANTINOU, F. K., and LILIENFELD, A. M. Pregnancy experience and the development of childhood speech disorders. *A. M. A. J. Dis. Child*, 91, 1956, 113-118.

A group of 424 white, non-defective (mentally), and non-palsied children with speech disorders receiving therapy in the Baltimore public schools were selected for study. Speech problems were classified as follows: articulation, 291; stuttering, 102; voice, 31; other types, 12; type not stated, six. A control group of children without speech problems was compiled by selecting the next birth reported from the same place of birth as the speech case, matched according to race and maternal age. The two groups were essentially similar with regard to socio-economic status. Fifty-two per cent of the subjects in both groups were males. Data regarding the two groups were compiled from the birth register of the Bureau of Vital Statistics of the Baltimore City Health Department and from the prenatal and paranatal records of the children.

The experimental group did not show more complications of pregnancy and delivery, prematurity, abnormal neonatal conditions, or previous reproductive casualty than the control group. 'It seems that pre- and paranatal brain injury may be largely eliminated as an important factor in the etiology of speech disorders in otherwise normal children. The findings of more multiple pregnancies and more later-born children in the speech-defective group suggests the role of psycho-social factors in the etiology of speech disorders.'

(*F. L. Darley*)

### Prematurity

NORMAN, A. P. The premature baby. *Practitioner*, 176, 1956, 352-359.

### Reading Retardation

ALTUS, G. T. A WISC profile for retarded readers. *J. consult. Psychol.*, 20, 1956, 155-156.

Twenty-five children were studied who had a discrepancy of two or more years between expected reading level, as derived from the Full Wechsler Intelligence Scale for Children, and actual reading level as measured by a standardized reading test. These children were given the WISC to determine if there is a distinctive patterning of sub-tests associated with severe reading disabilities. The verbal and performance IQ discrepancy was negligible but the sub-test patterning was distinctive. Arithmetic, Information, and Digit Symbol (Coding) tests appeared to be the most significant indicators of severe reading disabilities.

(*B. S. Street*)

### Recruitment

THOMSEN, K. A. The Metz recruitment test. *Acta Otolaryng.*, 45, 1955, 544-552.

The Metz technique is described as utilizing an acoustic bridge to evaluate changes in acoustic impedance introduced by the bilateral stapedius muscle reflex. In normal hearing individuals, the reflex is induced when a test tone is at a level 70-90 db above threshold. When such a reflex occurs for tones at levels less than 70 db above threshold, the presence of recruitment is said to be indicated. The advantages of such a test are reported to be as follows: it is objective and quick, it is applicable in cases of unilateral as well as bilateral hearing loss, and it can also be employed with cases of symmetrical hearing loss. According to the author, the test is not applicable if there is not an intact acoustic reflex arc, if there is a perforation in the tympanic membrane of the ear being evaluated, or if otosclerosis is present.

Eighty hard of hearing patients were administered this test along with the Fowler binaural loudness balance test. The results of the Metz test agreed with those of the Fowler test. The test did not indicate the presence of recruitment in any case where it should not have been present. A positive response on the test is said to be a definite indicator of recruitment. However, the author concludes that not too much importance can be attached to negative responses.

(*J. J. O'Neill*)

### Respiration

NISELL, O. I. and EHRNER, L. S. G. A simple apparatus for measurement of pressure relationship in respiration. *J. appl. Physiol.*, 8, 1956, 565-567.

An inexpensive, non-electrical apparatus for the measurement of human respiration by comparison of intraesophageal pressure with lung volume is described in detail.

(*I. E. Hegarty*)

### Role Taking

TURNER, R. H. Role-taking, role standpoint, and reference-group behavior. *Amer. J. Sociol.*, 61, 1956, 316-328.

### Shock Wave

CLEMEDSON, C.-J. and PETTERSSON, H. Propagation of a high explosive air shock wave through different parts of an animal body. *Amer. J. Physiol.*, 184, 1956, 119-126.

### Sound

VILLCHUR, E. M. Sound. *Audio-Engin.* 39(9)-40(4), 1955-56.

This is a series of thoroughgoing but relatively non-technical discussions of many facets of audio transmission, recording, and reproduction. Included in this series are discussions of the following: power amplifiers, pick-ups, tone arms, needles, preamplifiers and control units, disc recording, high fidelity standards, and acoustics.

(*C. N. Hanley*)

### Spastic Hemiplegia

HOOD, P. N. and PERLSTEIN, M. A. Infantile spastic hemiplegia: V. Oral language and motor development. *Pediatrics*, 17, 1956, 58-63.

The ages of children at the onset of speaking words and sentences and independent walking were determined by interviewing parents of 334 patients with spastic hemiplegia. A delay from normals of nine months in walking and talking words and a delay of six months in using sentences was found in the subjects with congenital hemiplegia and by those who acquired hemiplegia before the onset of walking and talking. Other findings indicated that patients with left hemiplegia walked and talked from two to three months earlier than right hemiplegiacs. The presence of seizures and mental deficiency was said to have delayed walking and talking more than the physical defect of hemiplegia *per se*.

(*B. B. Schlanger*)

### Stapes Mobilization

GOODHILL, V. and HOLCOMB, A. L. The surgical audiometric nomograph in stapedolysis (stapes mobilzation). *Arch. Otolaryng.*, 63, 1956, 399-410.

### Stuttering

BARBARA, D. A. The classroom teacher's role in stuttering. *Speech Teacher*, 5, 1956, 137-141.

The author describes the home and school conditions which create stuttering from normal non-fluent speech. Specific illustra-

tions are given of undesirable handling of young school children who stutter.

(*W. L. Thurman*)

FREUND, H. Psychosis and stuttering. *J. nerv. ment. Dis.*, 122, 1955, 161-172.

European and American contributions to the problem of the relationship between psychosis and stuttering are reviewed, evaluated, and compared with the writer's observations on stuttering in psychotics. The author feels that studies on frequency and distribution of stuttering among functional and organic mental illnesses and other groups of deviates should be critically analyzed and evaluated as this analysis may represent a new lead in the search for important etiologic factors in stuttering.

(*B. S. Street*)

HELTMAN, H. Don't teach your child to stutter. *Today's Hlth.*, 34, 1956, 34-35, 62-63.

A popularized discussion is presented of the danger in mistaking normally nonfluent speech in a child for 'stuttering.'

(*W. L. Thurman*)

JAMESON, A. M. Stammering in children—some factors in the prognosis. *Speech*, 19, 1955, 60-67.

Sixty-nine children were re-examined at least one year after they were discharged from therapy for stammering. The conclusions are: (1) a family history of stammering is found more often in children with a severe stammer; these children are less likely to regain normal speech; (2) the age and mode of onset of the stammer are not significantly related to the success of therapy; (3) frequent parental correction of the stammer hinders speech improvement; (4) there is a greater chance of speech recovery if therapy begins when the child is under five years, or within one year of the onset of difficulty.

(*A. J. Berlin*)

MCCORD, H. Hypnotherapy and stuttering. *J. Clin. exper. Hypnosis*, 3, 1955, 210-214.

A review of articles on stuttering therapy as discussed in hypnosis literature is presented. The author states that the evidence from these materials would indicate that hypnotherapy is a technique deserving further attention by research-minded speech pathologists who have hypnotherapy training and skill.

(*J. J. O'Neill*)

WOHL, M. T. The sequelae of stammer. *Speech*, 19, 1955, 68-70.

The psychological characteristics of a group of stammerers and controls were compared. Significant differences were found for introspection, sulking, hyperemotionalism, suggestibility, proneness to weeping, negative disobedience, fidgeting and fears.

(*A. J. Berlin*)

### Temporal Bone Surgery

HOUSER, K. M. and DIETRICH, H. J. Temporal bone surgery in otitis media and mastoiditis. *Arch. Otolaryng.*, 63, 1956, 146-152.

The various surgical procedures for the treatment of acute and chronic temporal bone infection are reviewed.

(*J. M. Palmer*)

### Therapy Programs

IRWIN, R. B. State programs in speech and hearing therapy: III organization and administration. *Speech Teacher*, 5, 1956, 125-131.

This is the last of three articles dealing with information on state speech and hearing programs obtained from state directors of special education or supervisors of speech and hearing therapy. Descriptions and comparisons of case load regulations and practices, patterns of organization, and costs of therapy are given.

(*W. L. Thurman*)

MITCHELL, J. The speech therapist in the geriatric unit. *Speech*, 19, 1955, 4-13.

The work of one speech therapist on a geriatric team is described. Over a period of two years all but one of her 27 patients had symptoms of dysphasia or dysarthria. Special treatment problems for the aged are discussed, including frequency and regularity of sessions, prognosis and contraindications. A tabular appendix summarizes the diagnosis and results for each patient.

(*A. J. Berlin*)

SMITH, S. State organization of speech therapy services in Denmark. *Speech*, 19, 1955, 71-73.

This article describes state supported speech therapy given at two institutes with residence facilities and a combined staff of 31 specialists. Teachers may be qualified after two to four months training at the institutes. Publications, research, and future plans are noted.

(*A. J. Berlin*)

MCLEOD, A. L. Speech therapy in Australia. *Speech*, 19, 1955, 27-28.

Professional qualifications and courses in the three-year speech therapy training program in Australia are described.

(*A. J. Berlin*)

### Tinnitus

SCHNEER, H. I. Psychodynamics of tinnitus. *Psychoanal. Quart.*, 25, 1956, 72-78.

### Vertigo

HONJO, S. and FURUKAWA, R. The surgical treatment of vertigo. *Arch. Otolaryng.*, 63, 1956, 153-157.

This report of two cases of labyrinthine surgery used in treatment of vertigo indicates lack of success with coagulation methods. Vertigo was not eliminated and hearing was not preserved. The authors suggest that more radical surgical destruction of labyrinth structures should be used.

(*J. M. Palmer*)

### Vestibular Tests

FABRICANT, N. D. and NEFFSON, A. H. Labyrinthine (vestibular) function tests, II: Interpretation. *Amer. J. med. Sci.*, 231, 1956, 441-450.

The authors review the interpretation of vestibular function tests, both the spontaneous manifestations of disturbed function and the abnormal responses to stimulation. They warn that conclusions should not be based upon a single examination and that these tests can aid in the localization of a lesion but not in the determination of the nature of the lesion.

(*F. L. Darley*)

### Voice Training for the Deaf

FREUD, E. D. Speech and voice training of the deaf. *Arch. Otolaryng.*, 63, 1956, 183-195.

Following the presentation of a detailed history of the education of the deaf, the author describes his 'vocal stimulator.' This is 'an apparatus which, when brought into contact with a normal, healthy larynx picks up the vibrations of the vocal cords during phonation and transmits them amplified to the larynx of the deaf.' A case history is offered to illustrate the advantages of the apparatus.

(*J. M. Palmer*)

### Vocational Planning

MILLER, M. R. and KETRON, F. D. Measuring the job potential of the disabled. *J. Rehabilit.*, 11(6), 1955, 10-11, 14-15.

The authors report on the approach of the Indianapolis Goodwill Industries and the Indiana Vocational Rehabilitation Division to the evaluation of the job potential of disabled individuals. The approach includes not only medical, social, and psychological evaluation, but also the appraisal of the handicapped person in actual job situations. There is said to be a growing positive response from industry toward individuals who have gone through this appraisal, as well as a better understanding from the individuals of their own abilities and limitations.

(*V. B. Carroll*)

YERKES, W. Vocational planning for hard of hearing students. *Hearing Dealer*, 6(3), 1956, 6-8, 22.

# News And Announcements

## Significant Trends in the Professions

In a summary statement of a report to the President by the Committee for the White House Conference on Education there are a number of important recommendations. The Committee recognizes that ignorance is a far greater handicap to an individual than it was a generation ago and that an uneducated population is a greater handicap to a nation. It is no longer considered proper to restrict educational programs to the skills of the mind alone. According to the report, the schools should attempt to improve children's health, to provide vocational training, and to do whatever else is needed to bring a child up to the starting line of adult life as even with his contemporaries as native differences in ability permit.

It is also pointed out that the onrush of science has outstripped the schools. Many schools which seemed good enough a generation ago now are a disgrace to the communities in which they stand.

The Committee also recommends studies of school systems in large cities where most American children are now congregated. Ways must be found to decentralize such systems in order to make them more responsive to the will of the people.

During the coming decade of teacher shortages, practical steps must be taken to utilize the services of available teachers more effectively, to make teaching a financially comfortable profession, and to devise ways to reward teachers according to their ability. Possibly the next two decades will be emergency periods during which the teacher shortage will grow more acute. Salary schedules should be adjusted to encourage able people to enter the profession. According to the Committee, teacher preparation programs which have the reputation of requiring needless and repetitious courses have the effect of deterring brilliant young people from becoming teachers.

It seems obvious to the Committee, in view of the objectives of education, that within the next decade the dollars spent on education in this Nation should be approximately doubled. A final recommendation suggests that a White House Conference on Higher Education, similar to that just concluded on the needs of the elementary and secondary schools, be held promptly. The full report of the Committee for the White House Conference on Education is available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. at a cost of 40 cents a copy.

## News and Announcements

Fellowships ranging from $500 to $2500 will be given for satisfactory manuscripts in the history of education by the Michigan Historical Commission through the John M. Munson Michigan History Fund upon acceptance of the manuscript by the Commission. Manuscripts accepted by the Commission will be published. Fellowship will be in lieu of royalty; the ownership of the manuscript will be in the Commission. Applications received up to March 1, 1957 will be considered. For details write Dr. Lewis Beeson, Executive Secretary, Michigan Historical Commission, Lewis Cass Building, Lansing 13, Michigan.

Columbia University College of Physicians and Surgeons presents four postgraduate cerebral palsy courses for physicians, therapists, and nurses. Physicians courses run from October 15 to November 2, 1956 and March 4 to March 22, 1957. The course includes lectures and demonstrations plus five days experience in cerebral palsy facilities with opportunity for discussion with the physician in charge. The Therapists and Nurses' courses run from October 15 to December 14, 1956 and March 4 to May 3, 1957. Scholarships covering tuition and

*News and Announcements* is edited by Mary W. Huber, Los Angeles State College, assisted by the following committee: Sue Earnest, San Diego State College; Lester L. Hale, University of Florida; Henry Moser, Ohio State University; Severina Nelson, University of Illinois; Max Nelson, Michigan State College, and Earl Schubert, State University of Iowa.

maintenance are available from several sources. For information, write to Office of the Dean, College of Physicians and Surgeons, 630 West 168th Street, New York, 32, N. Y.

The Northwestern University School of Speech is under contract to study the effect of a noisy environment on hearing. This project may be beneficial to personnel working near jet engines. James Jerger, Research Audiologist in the Northwestern University Speech School, is principal investigator for the research. Raymond Carhart, Professor of speech correction and audiology, is the project director.

Dr. Mildred F. Berry, Professor of Speech and Director of the Speech Center at Rockford College, Rockford, Illinois, has been awarded a lectureship in Denmark under the Fulbright Act. Dr. Berry had a similar appointment to the University of Oslo Medical School in 1952-53. In her new assignment, she will be affiliated with the University of Copenhagen and the Society for Crippled Children in Copenhagen. Dr. Berry will be concerned primarily with lectures and clinical services for speech habilitation of children handicapped by organic disorders such as cerebral palsy and cleft palate.

Jayne Shover, Associate Director of the National Society for Crippled Children, is involved in planning the program for the National Council on Psychological Aspects of Physical Disability when it meets in connection with the annual convention of the American Psychological Association, August 30-September 5 in the Hotel Sherman, Chicago.

Dr. Margaret Hall Powers has recently been made Director of the Bureau of Handicapped Children and the Division of Speech Correction, a consolidation of two major divisions in the Department of Special Education in the Chicago Public Schools. The program includes four schools for crippled children and projects for the deaf, hard of hearing, the blind and partially seeing, for cardiac and epilepsy cases and home teaching. There is also a special education program in fifteen Chicago hospitals. Irma Kratovil has been appointed to the position formerly held by Dr. Powers, that of Supervisor of the Division of Speech Correction, in which seventy-six speech therapists are employed. Over 20,750 children are involved in the program for the handicapped in Chicago.

Dr. Dorothy Doob, Assistant Professor of Speech at Hunter College, New York has been appointed to the staff of St. Vincent's Hospital as Consultant and Director of the Speech Clinic. Her duties include the reorganization of the clinic, supervision of student therapists, and expansion of the program.

The American Hearing Society has awarded the Kenfield Memorial Scholarship to Miss Paula Kessel of Monroe, Michigan. This award is made annually to a prospective teacher of lipreading. Miss Kessel has been a member of the staff of the Dayton Hearing and Speech Society for the past year.

The National Executive Council of Sigma Alpha Eta, the Speech Correction fraternity, met in conjunction with the American Association for Cleft Palate Rehabilitation in Kansas City, May 2, 1956. Charters were granted to three new chapters; the organization now has thirty-nine active chapters in twenty-one different states. The chapters will hold their next convention at the time of the American Speech and Hearing Association Convention in Chicago, November 19-21. Inquiries regarding the organization may be directed to the national executive secretary, Dr. C. Cordelia Brong, Speech and Hearing Clinic, Louisiana State University, Baton Rouge, Louisiana.

The Institute for the Crippled and Disabled and the United States Office of Vocational Rehabilitation will prepare a limited number of highly qualified persons for the management and administration of comprehensive rehabilitation centers. The six months' academic and on-the-job training period will begin at the Institute in New York City on October 1, 1956. Age limits are 30 to 50 years. Bachelor degrees and three years of experience related to rehabilitation are required. $250 per month stipends and round trip travel expenses between the Institute and job training placements will be paid. For further information inquire of the Coordinator, Rehabilitation

Center Administrator's Preparation Program, Institute for the Crippled and Disabled, 400 First Avenue, New York 10, N. Y.

A state professional organization to be known as the Kentucky Society of Speech Therapists was formed in April, 1956, at the Veterans Hospital, Louisville, Kentucky. Dr. Charles F. Diehl, Director of the University of Kentucky Speech Clinic, was elected president. Thirty active members were enrolled at the organizational meeting.

The Speech and Hearing Clinic of the University of Alabama has a new, completely air conditioned building covering an area of approximately 8000 square feet. It has six clinical programs of therapy including a parental education-therapy group.

A preschool deaf class has been established at the Junior League Speech and Hearing Clinic in Columbia, South Carolina. Plans are now being made for the establishment of a similar preschool deaf program at the Junior League Speech and Hearing Clinic in Spartanburg, South Carolina.

Members of the staff, students, and patients of the Speech and Hearing Center of the University of Virginia participated in two television programs over the Petersburg, Virginia station recently.

In order to meet the needs of county health departments, county school systems, and other interested agencies, West Virginia University has established a system of lending informational material concerning audiometers, which has been sent to the University by various manufacturers of audiometers. The Speech and Hearing Clinic of West Virginia University makes up sets of material and distributes them to those units over the state requesting such information. Each set of material contains a sample type of descriptive material sent by each and every company to the University Clinic.

The University of Pennsylvania, at Philadelphia, announces an expansion of its program for the training of speech and hearing therapists. It will be possible for students who complete the program to meet the academic requirements for the Basic Certification in Speech, granted by the American Speech and Hearing Association. Provisions for clinical practice in cleft palate speech have been made in the Cleft Palate Clinic, Childrens' Hospital and a practicum for work with children with cerebral palsy will be conducted in the United Cerebral Palsy Chestnut Hill Center. Clinical experience with aphasics and dysarthrics will be provided in the Rehabilitation Center of the University Hospital. The total speech and hearing program is offered in the Department of Psychology under the direction of Dr. Frank P. Bakes, Associate Professor and Co-Director of the Speech and Hearing Center. This program represents a close integration of teaching and service of the Department of Psychology, the University Hospital, the Rehabilitation Center, and the Dental School. The expanded program is scheduled to begin in the fall term, 1956.

## Meetings Announced

American Speech and Hearing Association, November 19-21, 1956, The Palmer House, Chicago, Illinois.

Speech Association of America, Conrad Hilton Hotel, Chicago, Illinois, December 27-29, 1956.

Sixth International Congress of Otolaryngology, May 5-10, 1957, Washington, D. C.

National Society for Crippled Children and Adults, also known as the Easter Seal Society, October 28-31, 1956, Hotel Statler, Washington, D. C.

First Inter-American Conference on Occupational Medicine and Toxicology. September 3-7, 1956, Miami, Florida. The University of Miami, School of Medicine will serve as host. The official language of the program will be Spanish.

The 10th International Congress for Speech and Voice Therapy, September 3-7, 1956, Barcelona, Spain.

## New Materials

A film, the Moto-Kinaesthetic Method of Speech Training, in black and white, with sound, was produced under the direction of Dr. Edna Hill Young with the assistance of the Speech Department of the University of Denver. It is composed of 4 reels, approximately 15 minutes each, and priced at $75.00. The film may also be rented.

An Esophageal Speech Training Record has been produced by Mrs. Mary A. Doehler, Director of the Esophageal Speech Training at the Massachusetts Eye and Ear Infirmary. Mrs. Doehler is a laryngectomee herself. The cost is $2.00 plus seventy-five cents for mailing carton and postage. Write to Mrs. Mary A. Doehler, 26 Lombard Street, Newton 58, Massachusetts.

A complete index to the first forty volumes of the *Quarterly Journal of Speech* is the climax of twenty years of research carried on by Dr. Giles W. Gray, Professor of Speech, Louisiana State University. All articles are indexed by author, title, and by each significant word in the title, with cross references. The publisher of the index is William Brown, Co.

A pamphlet entitled 'Simultaneous Group Meetings of Cerebral Palsied Children and Their Parents' has been prepared by Dorothy Doob, Glen Boles, and Gladys Bobrick. This pamphlet describes concurrent treatment for parents and handicapped children. Excerpts from case histories are given as illustrative material. The pamphlet is distributed by United Cerebral Palsy, 369 Lexington Avenue, New York, 17, N. Y.

## Graduate Assistantships, Fellowships and Scholarships

*Clinical Assistantships.* Syracuse University, $1250 to $1750 with six hours remitted tuition each semester. Write Louis M. DiCarlo, The Gordon D. Hoople Hearing and Speech Center, Syracuse University, Syracuse 10, New York.

*Clinical Assistantships.* Purdue University. Starting September, February or July. Half-time. Twenty hours per week of clinical assistance. $1500 for regular school year (10 months), $1800 for calendar year (12 months); waiver of tuition fees. Student may enroll for 10 hours of graduate course work per semester. Ten hours per week of clinical assistance. $750 for regular school year (10 months); $900 for calendar year (12 months); waiver of tuition fees. Student may enroll for 14 hours of graduate course work per semester. Address M. D. Steer, Speech and Hearing Clinic, Purdue University, Lafayette, Indiana.

*Research Assistantships.* Voice Science Laboratory, Department of Speech, Purdue University. Starting September or February. Twenty hours per week of laboratory research assistance. $1500 for regular school year (10 months); waiver of tuition fees. Student may enroll for 10 hours of graduate courses per semester. Address M. D. Steer, Speech and Hearing Clinic, Purdue University, Lafayette, Indiana.

*Teaching Assistantships.* Department of Speech. Starting September or February. Half-time. Teach two sections of Principles of Speech or serve as drill-master for several sections of Voice, Articulation, and Verbal Skills, and serve as clinician in the Speech and Hearing Clinic. $1500 for academic school year (10 months); waiver of tuition fees. Student may enroll for 10 hours of graduate courses per semester. Address A. H. Monroe, Department of Speech, Purdue University, Lafayette, Indiana.

*Research Assistantships.* University of Michigan. Speech Research Laboratory. Fall semester of 1956-57; $600 per semester. The assistantship is for a student who wishes to carry on graduate work with a major in speech science. Applicants should have some previous training and an interest in mathematics, science, and speech. They should expect to take further courses in science during the progress of their graduate work. Responsibilities include laboratory work in electro-acoustics and research on speech, and assistance with laboratory instruction in courses in experimental phonetics. Address: Gordon E. Peterson, Department of Speech, 3223 Angell Hall, University of Michigan, Ann Arbor, Michigan.

*Graduate Assistantships.* Speech Clinic, University of Michigan. 20 hours per week or less. Stipends per semester for master's degree candidates $663.00; first year Doctoral candidate $742.00; second year Doctoral candidate $795.00 and third year Doctoral candidate $848.00. Applicants may express a preference for work in one of the following six divisions: Adult, Children, Dysphasia, Examining, Hearing, or Student Clinic. Address: H. Harlan Bloomer, Director, Speech Clinic, University of Michigan, Ann Arbor, Michigan.

*Assistantships.* Boston University. Speech and Hearing Center. Assistants participate in both diagnosis and therapy. Speech therapy and audiology. Remission of $600 tuition for full-time graduate study. Address Wilbert L. Pronovost, Director, Speech and Hearing

Center, Boston University, Boston, Massachusetts.

*Graduate Assistantships.* University of Nebraska. In Speech and Hearing. Available beginning September 1956. $1,000 plus waiver of tuition. Applicants apply to Dr. Leroy T. Laase, Speech Department, University of Nebraska. Other special assistantships in hearing may be available.

*Research Assistantships.* University of Wisconsin. September 1956 through August 1957. In galvanic skin response audiometry with severely handicapped or disturbed populations. Annual stipend $1620. Full facilities are available to implement the assistantship. Application should be made to John V. Irwin, Speech and Hearing Clinic, University of Wisconsin, Madison 6, Wisconsin.

## Necrology

Edward Charles Mabie, Head of the Department of Speech, State University of Iowa, died at the age of 63 on February 9, 1956. Professor Mabie played a key leadership role in the development of the Speech Pathology and Audiology program at the State University of Iowa.

Jane Bliss Taylor of the Speech Department staff of Hunter College, New York, died October 11, 1955. A Fellow and Honorary Life Member of the American Speech and Hearing Association, Miss Taylor was also one of the founders of the New York League for Speech Improvement and one of its most esteemed members.

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